

# BRIDGEPORT HARBOR CONNECTICUT

## SURVEY REVIEW OF REPORTS



CORPS OF ENGINEERS, U. S. ARMY  
OFFICE OF THE DIVISION ENGINEER  
NEW ENGLAND DIVISION, BOSTON, MASS.

FEBRUARY 24, 1956

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ARMY-NED-BOSTON

87092 (Bridgeport Harb. Conn.)

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SURVEY  
REVIEW OF REPORTS

BRIDGEPORT HARBOR  
CONNECTICUT

SYLLABUS

The Division Engineer finds that modification of the existing project for Bridgeport Harbor to provide a 35-foot main channel and turning basin is necessary to eliminate tidal delay to existing commerce and to permit the use of larger petroleum tankers. He further finds that provision of breakwater protection at Black Rock Harbor and three small craft anchorages is necessary to permit full use of the existing recreational fleet and provide for anticipated future expansion of this form of navigation. The benefits from each of the separate improvements are sufficient to justify its construction. Because part of the benefits from the recreational improvements are local in nature the Division Engineer considers that these improvements should be contingent upon certain requirements of local cooperation which local interests have indicated to be reasonable. The Division Engineer finds that prospective benefits to general waterborne commerce and to recreational boating warrant further improvement of Bridgeport Harbor, and recommends modification of the existing navigation project for Bridgeport Harbor to provide for:

(a) Deepening the main ship channel to 35 feet at mean low water at an estimated first cost to the Federal government of \$1,700,000, with \$5,000 annually for maintenance in addition to that now required.

(b) Construction of two breakwaters at the entrance to Black Rock Harbor at an estimated cost to the Federal government of \$231,000 with \$1,000 annually for maintenance.

(c) An anchorage in Burr and Cedar Creeks, 28 acres in area, six feet deep, at an estimated cost to the Federal government of \$80,000, with \$3,000 annually for maintenance.

(d) An anchorage at the head of Johnsons River, two acres in area, six feet deep, at an estimated cost to the Federal government of \$11,000, with \$300 annually for maintenance.

(e) An anchorage on the west side of lower Johnsons River, 2.4 acres in area, nine feet deep, and 0.6 acres in area, six feet deep, at an estimated cost to the Federal government of \$5,000, with \$200 annually for maintenance.

Exclusive of aids to navigation estimated to cost \$4,800, the total estimated cost of the new work for the above modifications is \$2,441,000, of which the total cost to the United States is estimated to be \$2,027,000, with \$9,500 annually for additional maintenance. The improvements are recommended subject to certain requirements of local cooperation. The Division Engineer recommends that local interests provide all necessary berth improvements, suitable spoil disposal areas, public landing facilities in Black Rock Harbor and at each of the proposed small craft anchorages, and contribute 52 percent of the cost of the Black Rock Harbor Breakwaters (this contribution presently estimated to be \$249,000), 66 percent of the cost of the Burr and Cedar Creek Anchorage (this contribution presently estimated to be \$155,000), and 45 percent of the cost of the Upper Johnsons River Anchorage (this contribution presently estimated to be \$10,000). The presently estimated total cost of local contribution on the recommended projects is \$414,000. The improvements are all recommended independently of each other, to be constructed singly or concurrently as may be desired.

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CORPS OF ENGINEERS, U. S. ARMY  
OFFICE OF THE DIVISION ENGINEER  
NEW ENGLAND DIVISION  
857 COMMONWEALTH AVENUE  
BOSTON 15, MASS.

24 February 1956

SUBJECT: Survey (Review of Reports) of Bridgeport Harbor, Conn.

TO: Chief of Engineers, Department of the Army, Washington 25, D. C.

AUTHORITY

1. This report on survey of Bridgeport Harbor, Connecticut, is in review of previous reports and is submitted in compliance with the following resolutions,

a. Resolution adopted April 20, 1948 by the Committee on Public Works of the United States Senate, as follows:

"Resolved by the Committee on Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on Bridgeport Harbor, Connecticut, contained in House Document Numbered 680, Seventy-ninth Congress, Second Session, and previous reports, with a view to determining if any modification of the existing project in view of changed shipping and economic conditions, is advisable at this time."

b. Resolution adopted March 15, 1949, by the Committee on Public Works of the House of Representatives, United States, as follows:

"Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on Bridgeport Harbor, Connecticut, submitted in House Document No. 680, 79th Congress, 2d Session, with a view to determining the advisability of modifying the existing project in view of changed shipping and economic conditions, particularly with regard to the main channel and anchorage areas."

c. Resolution adopted July 20, 1954, by the Committee on Public Works of the United States Senate, as follows:

"Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report of the Chief of Engineers on Bridgeport Harbor, Connecticut, published as House Document Numbered 281, Seventy-first Congress, Second Session, and other reports, with a view to determining whether the existing project should be modified at the present time, with particular reference to Johnsons River below Hollisters Dam."

### SCOPE OF SURVEY

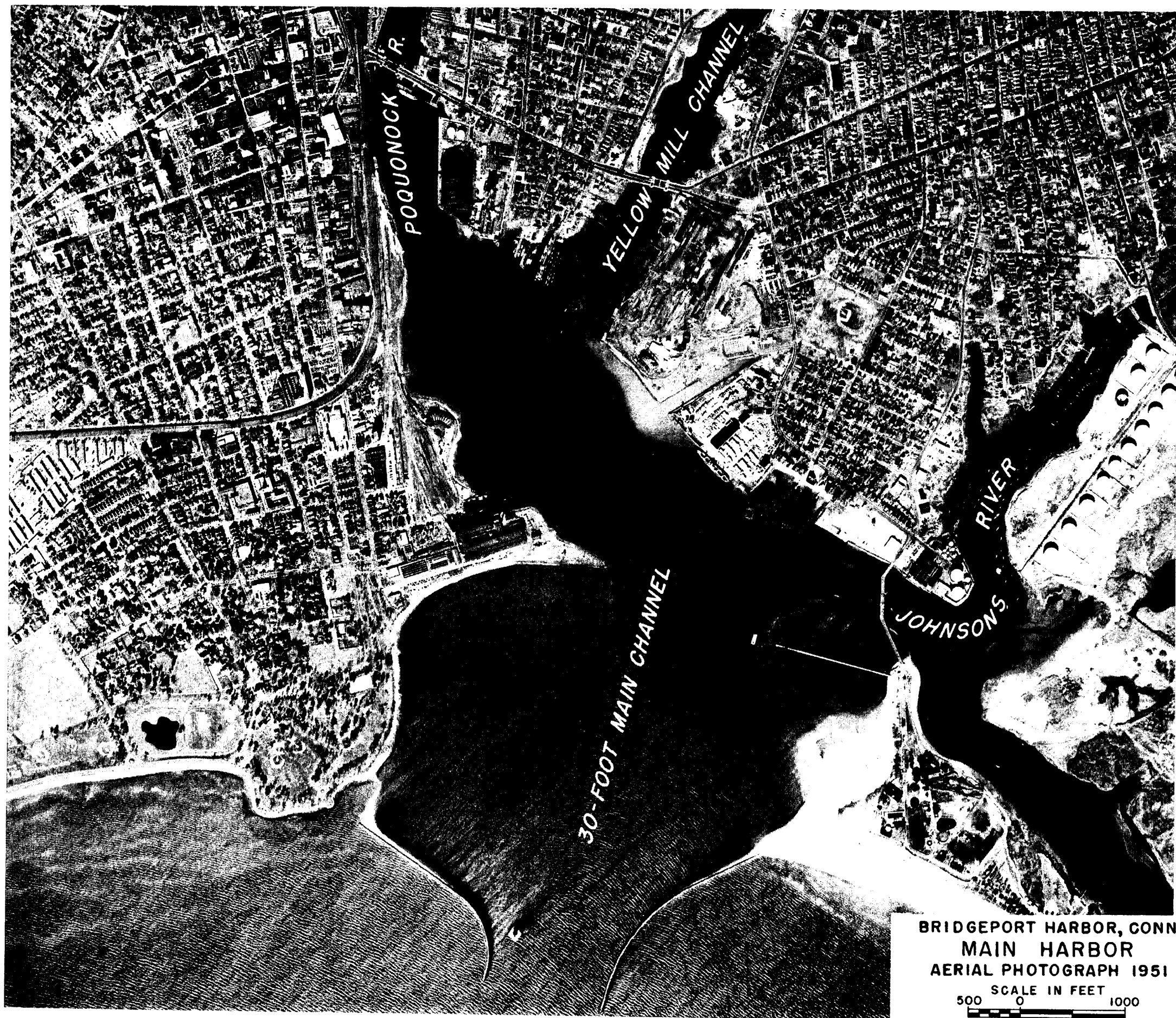
2. A review of report of survey scope was assigned to the New England Division by the Chief of Engineers on April 11, 1949, and August 3, 1954.

3. In the preparation of this report, a detailed hydrographic survey consisting of soundings, probings and sample borings was made, from which the character of the harbor bottom and estimated quantities to be dredged were determined. Available maps, commercial statistics and other data pertaining to the harbor have been studied. A public hearing was held at Bridgeport, Connecticut, on December 15, 1949, and information obtained therefrom is described under Improvement Desired. The information obtained from the public hearing is further supplemented by recent contacts with local interests and correspondence submitted by them, and all additions or changes in improvements requested subsequent to the public hearing, are incorporated and considered in this report.

### DESCRIPTION

4. Bridgeport Harbor is located on the north shore of Long Island Sound about 20 miles west of New Haven Harbor, and about 57 miles east of New York City. It consists of two widely separated units: the main harbor, serving the east and central portions of the city; and Black Rock Harbor, located about 2 miles westward, serving the western portion of the city.

5. The main harbor consists of an outer area seaward of Tongue Point in a shallow open bay about 1 mile long and from one third to three quarters of a mile wide; and an inner area from 500 to 1,500 feet wide, extending inland about 1 mile in a northwesterly direction. The entrance to the outer harbor from Long Island Sound is protected by two converging breakwaters. The developed inner harbor includes several tributaries. The Poquonock River, navigable for about one and one quarter miles, enters from the north-northwest. Yellow Mill Channel, about one mile long, and from 150 to 200 feet wide, enters from the north-northeast, a short distance east of the Poquonock. The combined waters of Johnsons River, which is 150 to 250 feet wide and navigable for about one mile, and of White Rock Creek and Lewis Gut enter at the upper eastern side of the outer harbor. The last three waterways drain an



BRIDGEPORT HARBOR, CONN.  
MAIN HARBOR  
AERIAL PHOTOGRAPH 1951

SCALE IN FEET  
500 0 1000

extensive marsh area, known as Stratford Meadows, of approximately 1,400 acres located east of the outer harbor. The main harbor and its tributaries are shallow with natural depths of 8 feet or less, except for dredged channels and anchorages.

6. Black Rock Harbor, about 2 miles west of the main harbor, consists of a broad outer bay with a narrow arm extending northward between the mainland on the west and Fayerweather Island on the east, a long, narrow peninsula that was formerly an island. The harbor proper is about one mile long and has a width reducing from about 2,500 feet at its entrance to about 250 feet at its northern end. Burr and Cedar Creeks, navigable for about  $1/4$  and 1.1 miles, respectively, enter at the upper end of the harbor. Natural depths in the harbor range from about 12 to 14 feet at the entrance to about 2 feet in Cedar Creek.

7. Through the main harbor at Bridgeport, a channel 400 feet wide, except in the inner harbor, has been dredged to a depth of 30 feet at mean low water from deep water in Long Island Sound between the breakwaters to a point a short distance below Stratford Avenue Bridge across the Poquonock River, a distance of about 4 miles. East of this channel and near the upper end of the outer harbor there is a 30-foot turning basin and a 25-foot anchorage and southwest of the channel, in the inner harbor, there is an 18-foot anchorage. Controlling depths in these areas are 29 feet, 22 feet and 18 feet respectively. Controlling depths in the navigable channels of the Poquonock and Yellow Mill channels are 18 feet. The controlling depth in the Johnsons River channel is 15 feet to a point 1,700 feet below Hollisters dam, and thence 9 feet to a point 600 feet below Hollisters dam. The harbor is well protected from storms. In the entrance channel, between the breakwaters, the average velocity at strength of flood or ebb tide is about three quarters of a knot. The mean range of tide is 6.8 feet.

8. Through Black Rock Harbor, a channel 100 to 200 feet wide has been dredged to a depth of 18 feet from the 18-foot contour outside Black Rock Harbor to the heads of both branches of Cedar Creek, a distance of about 2.4 miles, and a 7-foot channel has been dredged about  $1/4$  mile into Burr Creek. Controlling depths in the main channel and in the Burr Creek channel are 18 feet and 2 feet respectively. Black Rock Harbor is protected from the west by the mainland, and partially protected from the south by Black Rock and Penfield Reef, and the inner portions of the harbor are well protected from all directions except the south. The mean range of tide in Black Rock Harbor is about 7.0 feet.

9. Both the main harbor and Black Rock Harbor are shown on United States Coast and Geodetic Survey Charts Nos. 220 and 1213, and on Plate 1, 2, and 3 accompanying this report.

### TRIBUTARY AREA

10. The area tributary to Bridgeport Harbor includes about 500 square miles, with a total population of 400,000, of which about 40 per cent are located in Bridgeport, and the remainder in 21 cities and towns so situated that they can be served more economically from Bridgeport than from either New York or New Haven. Bridgeport and surrounding cities and towns are primarily engaged in manufacturing, producing textiles, sheet brass, hardware, arms and ammunition, electrical power and appliances, and steel and iron products. Important aircraft factories are located in Stratford. Agriculture is the chief occupation in the smaller surrounding towns.

11. Bridgeport lies on U. S. Route No. 1 and on the main line of the New York, New Haven, and Hartford Railroad between New York and Boston, and is the terminus of a branch line serving the Housatonic and Naugatuck Valleys. Through the main and branch lines of this road, and their inter-connecting lines, adequate rail service is provided to all parts of the country having rail facilities. Access to the waterfront is available over modern highways from all parts of the city.

### BRIDGES

12. No bridges cross the main harbor at Bridgeport, or any part of Black Rock Harbor, but a series of bridges cross the navigable tributaries of the main harbor. Johnsons River is crossed at its mouth about 1.3 miles above the harbor entrance breakwaters by the Pleasure Beach Bridge, a swing type highway bridge with a horizontal clearance of 65 feet and a closed vertical clearance of 7.3 feet at mean high water. Yellow Mill Channel is crossed just above its mouth and about 1.6 miles above the Harbor breakwater entrance by the Stratford Avenue Bridge, a bascule type highway bridge with a horizontal clearance of 82.5 feet and a closed vertical clearance of 11.5 feet. The Poquonock River is crossed by five bascule lift bridges, four highway and one railroad, the first bridge being at the river mouth, these bridges being at points 1.9, 2.2, 2.3, 2.5 and 2.7 miles above the harbor-mouth breakwaters, as follows: (1) the Stratford Avenue Bridge, with a horizontal clearance of 135 feet and a closed vertical clearance of 7.6 feet; (2) a railroad bridge with a horizontal clearance of 70 feet and a closed vertical clearance of 18.1 feet; (3) the Congress Street Bridge, with a horizontal clearance of 67 feet and a closed vertical clearance of 8.1 feet; (4) the East Washington Avenue Bridge, with a horizontal clearance of 69 feet and a closed vertical clearance of 4.8 feet; and (5) the Grand Street Bridge, with a horizontal clearance of 71 feet and a closed vertical clearance of 13.2 feet. The Secretary of the Army has recently approved the construction of two fixed high level highway bridges over the navigable portion of the waterway in Bridgeport. One bridge, with a horizontal clearance of 150 feet and a vertical clearance of 65 feet will cross the Poquonock River just downstream from the Stratford Avenue Bridge. The second bridge, with a





BRIDGEPORT HARBOR, CONN.  
BLACK ROCK HARBOR  
AERIAL PHOTOGRAPH 1951

SCALE IN FEET  
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horizontal clearance of 100 feet, and a vertical clearance of 40 feet, will cross Yellow Mill Channel approximately 600 feet upstream from the present Stratford Avenue Bridge. All vertical clearances cited above are clearances at mean high water.

### PRIOR REPORTS

13. Bridgeport Harbor, including Black Rock Harbor and Johnsons River, has been the subject of numerous reports since 1827. Those submitted since 1930 are described in a table below and were all favorable reports resulting in authorization for further improvement. Data on other prior reports are given in House Document No. 214, 82d Congress, 1st Session.

### RECENT REPORTS ON BRIDGEPORT HARBOR

<u>Published in Document No.</u>	<u>Improvement Authorized</u>	<u>Date of R&amp;H Authorizing Act</u>
H.D.No. 281 71st Congress 2nd Session	25-foot anchorage; 18-foot channel in Poquonock River, Yellow Mill Pond, Black Rock Harbor, and Cedar Creek.	July 3, 1930
H.D.No. 232 75th Congress 1st Session	Relocation of 18-foot anchorage.	Aug. 26, 1937
H.D.No. 819 76th Congress 3rd Session	30-foot main channel 400 feet wide; elimination of 12-foot anchorage area.	Mar. 2, 1945
H.D.No. 680 79th Congress 2nd Session	30-foot channel re-alignment; 30 foot turning basin; Johnsons River channel project depth reduced from 18 feet to 15 feet and 9 feet.	July 24, 1946

### EXISTING CORPS OF ENGINEERS PROJECT

14. Federal improvement of Bridgeport Harbor began in 1838 when an 8-foot channel, 60 feet wide, was dredged over the outer bar which had a natural depth of 5 feet. Further improvement prior to 1898 included dredging the entrance channel to 14 feet, dredging a channel from the entrance to above Steel Point, and constructing jetties. In 1899 the projects for the main harbor and Black Rock Harbor were combined. Between 1897 and 1930, the most important improvements were the construction of the entrance breakwater, successive dredging of the entrance channel to depths of 20, 22, and 25 feet, and dredging

an anchorage near the inner end of the entrance channel. Since 1930, four favorable reports have been the basis of authorizations for 18, 15, and 9-foot channels in the tributaries of the main harbor and in Black Rock Harbor and Cedar Creek; dredging of a 25-foot anchorage, minor re-alignment of the 18-foot anchorage in the main harbor; and dredging of a 30-foot main channel, 400 feet wide, and a 30-foot turning basin in the main harbor.

15. The existing project, authorized by the act of July 4, 1836, and subsequent acts, provides for the following:

(a) Two riprap breakwaters, one about 3,823 feet long on the easterly side, and one 2,110 feet long on the westerly side of the entrance to the main harbor.

(b) The construction and maintenance of shore protection on Fayerweather Island, including a sea wall connecting the northerly and southerly portions of the island.

(c) A main channel 30 feet deep and generally 400 feet wide from Long Island Sound, widened to within 75 feet of the harbor line at the bend opposite the Cilco Terminal, and decreasing in width to 250 feet at a point about 720 feet below the Stratford Avenue Bridge across the Poquonock River.

(d) A turning basin 30 feet deep at the entrance to Johnsons River channel.

(e) Two anchorage basins: one 25 feet deep about 30 acres in area, opposite Tongue Point and east of the channel, and one 18 feet deep and 36 acres in area, adjoining the main channel on the west, north of Tongue Point.

(f) Poquonock River Channel, 18 feet deep and from 125 to 200 feet wide, from the upper limit of the 30-foot channel to a point about 500 feet below the dam at Berkshire Avenue, about 1.2 miles.

(g) Yellow Mill Pond Channel, 18 feet deep and 150 to 200 feet wide from the main channel to a point about 370 feet from Crescent Avenue, about 1 mile.

(h) Johnsons River Channel, 15 feet deep and generally 200 feet wide to a point about 1,700 feet below Hollisters Dam, thence 9 feet deep and 100 feet wide to a point about 600 feet below Hollisters Dam.

(i) Black Rock and Cedar Creek Channel, 18 feet deep and 100 to 200 feet wide, from the 18-foot contour in Black Rock Harbor to the heads of both branches of Cedar Creek, about 2.4 miles.

(j) Burr Creek Channel, 7 feet deep and 100 feet wide, from its junction with Cedar Creek Channel to the south side of Yacht Street extended, about 1/4 mile.

16. The existing project is completed. The costs and expenditures prior to operations in 1900 under the project of 1899 were \$390,500, of which \$378,500 was for new work, and \$12,000 for maintenance. The costs under the existing project through June, 1954, have been \$2,957,700, of which \$2,206,900 was for new work, and \$750,800 for maintenance. The latest 1954 approved estimate for annual cost of maintenance is \$14,000. No recommended modification of the existing project is awaiting congressional action.

#### LOCAL COOPERATION

17. No conditions of local cooperation were prescribed in connection with Federal projects for improvement of Bridgeport Harbor prior to 1930. The 1945 modification of the existing project authorized the 30-foot main channel subject to the provision that local interests hold and save the United States free from claims for damages resulting from the improvement. The 1946 modification authorized the 30-foot turning basin and present authorized channels in Johnsons River subject to the provisions that local interests make necessary changes in Pleasure Beach Bridge, give satisfactory assurances that they would provide suitable berthing and unloading facilities for large tankers on the main harbor turning basin and adequate terminals on Johnsons River, and furnish free of cost of the United States all lands, easements, and rights-of-way and suitably bulkheaded disposal areas for the initial work and subsequent maintenance when and as required, and hold and save the United States free from damages resulting from the improvements. All these requirements have been met.

#### OTHER IMPROVEMENTS

18. No definite projects have been undertaken by local interests in the interests of general navigation. In the past, material has been removed by private interests from within the limits of the Federal project to provide deeper maneuvering room and more convenient access to commercial terminals. Private interests have deepened their berthing areas commensurate with present project depth and adapted their facilities for handling larger vessels.

19. In the spring of 1955, the Highway Department of the State of Connecticut began dredging in Bridgeport Harbor to obtain fill material to be stockpiled and used for highway construction. The permit, issued March 17, 1955, allowed dredging an area about 1,600 feet by 2,200 feet to a depth of 43 feet below mean low water south of the turning basin and Johnsons River Channel, in and to the east of the main channel, including the area of the 25-foot anchorage, to remove about 4,200,000 cubic yards of material.

### TERMINAL FACILITIES

20. In Bridgeport Harbor there are over 50 piers, wharves, and docks, 39 of these being commercial terminals, and the remainder small boat terminals. Of the 39 commercial terminals, 29 are located on the main harbor and its tributaries, and ten on Cedar Creek. Of the 14 small boat terminals, eight are located on the main harbor and its tributaries, and six in Black Rock Harbor. Direct rail connections are available at 15 of the commercial terminals, and mechanical handling facilities at 16.

21. The following is a complete tabulation of commercial and small boat terminals in Bridgeport Harbor:

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
United Illuminating Co. West side opposite Steel Point	Not yet constructed	/	/	/		Will be used for receipt of coal for power plant.
<u>MAIN HARBOR</u>						
City of Bridgeport (Steamboat Wharf)	Timber bulkhead, solid fill with timber pile, timber deck extension.	620'	10' to 18'		None. Area in rear of wharf used as a city parking lot.	Mooring of tow boats.
Bridgeport - Port Jefferson Steamboat Company, East side at Stratford Ave. bridge	Timber pile, timber-decked off-shore wharf with catwalk and mooring dolphin in line with face at east end of wharf.	300'	0' to 11'		60' x 145' transit shed. Electric adjusting passenger and auto loading ramp. Two 18' x 55' timber approach ramps to Stratford Avenue.	Terminal for ferry to Port Jefferson, New York.
City of Bridgeport (Municipal Wharf) East side at Stratford Ave. bridge	Timber pile, timber decked wharf, with catwalk and mooring dolphin in line with face at west end.	120'	5' to 11'		35' x 70' transit shed. Passenger loading ramp.	Mooring harbor patrol boat and city misc. storage.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth	M.L.W.		
United Illuminating Co., East side below Stratford Ave. bridge	Steel sheet pile bulkhead, solid fill, with timber pile concrete decked extension along west side.	1295'		16' and 30'	One 5-ton electric traveling bridge crane with hinged cantilever boom and belt conveyor system for unloading coal. Pipe lines to 2 steel oil storage tanks. 300 x 600' coal storage area. Oil storage capacity 20,000 barrels.	Receipt of coal and oil for power plant consumption.
Andrew Radel Oyster Co. East side just west of Yellow Mill Channel	Timber pile, timber deck.	388'		13'	None	Mooring own oyster boats.
H. J. Lewis Oyster Co. East of Radel Pier	Timber bulkhead, solid fill with timber decked extension on all sides.	554'		6' to 13'	Portable conveyors for loading shells. Open shell storage area. Frame building used as offices, oyster house and storage	Receipts of oysters. Shipment of shells. Mooring of own oyster boats.
Hitchcock Gas Engine Co. East of Lewis pier	Timber pile, timberdeck	552'		12 to 13'	20-Ton Stiff leg derrick. 600-Ton marine railway. Fuel and water for small craft. Carpenter shop and Shipbuilding Shed.	Mooring small craft for engine repair or fuel.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

BERTHING SPACE

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	Depth		FACILITIES	USE
				at M.L.W.		
City Lumber Co. of Bridgeport, Inc. (Cilco terminal) East side, east of Yellow Mill channel.	Timber Bulkhead, solid fill with timber pile, timber decked extension; mooring piles in line with face at west end.	970'	30'	to 31'	Mobile and crawler cranes, fork lift trucks and lumber storage yard. Saw mill.	Receipt of lumber. Re- ceipt and ship- ment of general cargo.
Buckley Bros., Inc. East side, west of Pleasure Beach Bridge, at entrance to Johnsons River. (Offshore Pier)	Timber pile, timber decked offshore pier with 180' x 6' ap- proach; fronted by mooring dolphins.	600'	32'	to 33'	Four 12" pipelines to 10 steel storage tanks at foot of Seaview Ave. and under Johnsons River to 13 steel storage tanks; total capacity 1,910,000 barrels. Mast and boom derrick for handling hose.	Receipt and shipment of petroleum pro- ducts. Bunker- ing vessels.
City of Bridgeport (Pleasure Beach pier). East side south of Johnsons River channel.	Timber pile, timber decked 50' x 100' offshore pier with 20' x 1,400 approach pier.	200'	25'		20' x 100' shed. Note: The outer 500' of this pier to be removed in 1955 by State of Connecticut in connec- tion with dredging for highway fill.	Landing excu- sion boat passengers.



COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
<u>JOHNSONS RIVER</u>						
Buckley Bros., Inc. North side, east of Pleasure Beach Bridge.	Timberpile, timber- decked pier with moor- ing dolphins and walk- ways extending west and east in line with face.	250'	16'		Pipelines from pier to storage tanks described under Buckley Bros. off- shore pier in the main harbor.	Receipt and shipment of petroleum products.
Buckley Bros., Inc. West side (River Wharf)	Timber bulkhead, solid fill, with timberpile, timberdecked extension.	154'	7' to 9'		Four 6" pipelines to storage tanks described under Buckley Bros. off- shore pier in the main harbor	Receipt and shipment of petroleum products.
Wolverine Motor Works, Inc. West side of 9' channel.	Part timber and part steel sheet pile bulk- head with solid fill.	90'	12'		None	Mooring small craft for en- gine installa- tion and repair.
Sun Oil Co. East side opposite Buckley Bros. River Wharf	Timber pile, timber- decked offshore pier with mooring dolphins north and south in line with face of pier. 10' x 80' approach walk way.	240'	15'		Two 6" pipelines to two steel oil storage tanks. Total capacity 50,000 barrels. One motor oil steel storage tank 15,000 gal.	Receipt of petroleum pro- ducts for dis- tribution.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
<u>YELLOW MILL CHANNEL</u>						
The American Oil Co. West side south of Stratford Ave. Bridge	Timber bulkhead, solid fill, fronted by moor- ing dolphins and timber platform.	260'	7'		Three pipelines to 6 steel oil storage tanks, total capacity 17,920 barrels.	Receipt of pet- roleum products.
F. J. Kisco (operated by Buckley Bros. and Sunfield Oil Co.) West side near upper end of channel.	Timber bulkhead, solid fill, with timber pile timber-decked extension.	175'	14'		Three pipelines to 2 steel storage tanks (7,500 barrels) leased by Buckley Bros. and 3 steel storage tanks (5,200 barrels) leased by Sunfield Oil Co. Total storage capacity 12,700 barrels.	Receipt of pet- roleum products.
Singer Manufacturing Co. West Side near upper end of channel.	Timber pile, timber decked offshore wharf with 50' x 6' approach at north end.	175'	6' to 11'		One 6" pipeline to 2 steel storage tanks. Total storage capacity 9,500 barrels.	Receipt of pet- roleum products for plant con- sumption.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

BERTHING SPACE					
NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	Depth	FACILITIES	USE
			at M.L.W.		
New England Coal and Coke Co., East Side	Timber bulkhead, solid fill with timber pile timber decked extension. Partly collapsed.	600'	18' to 19'	Crawler cranes, rail-road spur to NYNH&H RR. Three 6" and one 4" pipelines to 9 steel storage tanks, total capacity 32,166 barrels. Open storage for 30,000 tons of coal.	Receipt of coal and petroleum products.
Harbor Holding Co. operated by Bridgeport Concrete Co., East side.	Timber bulkhead, solid fill with timber pile timber decked extension	150'	0' to 8'	Crawler crane, hopper and conveyor to ready-mix concrete plant. Spur to NYNH&H RR. Open storage for 800 tons of sand and gravel.	Receipt of sand and gravel.
Northeastern Steel Co. (Upper pier) East side below Stratford Ave. bridge.	Timber pile, timber decked offshore wharf fronted by mooring piles and walkway. Shore approach by 140' walkway and coal conveyor.	258'	10' to 14'	1½-ton coal unloading tower with conveyor to RR tracks and plant. Plant tracks connect to NYNH&H RR.	Not used.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

BERTHING SPACE

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	Depth at M.L.W.	FACILITIES	USE
Northeastern Steel Co. (Lower Wharf) East side near main harbor channel.	Timber bulkhead, solid fill with timber decked extension; additional 200' timber pile timber decked extension in line with face at north end; curved railroad trestle from shore to extension at north end.	450'	14'	10-ton electric gantry crane, 10-ton steam locomotive crane, 7-ton electric locomotive crane, all with electric magnet and buckets. Two surface tracks on wharf and one on extension at north end connect with plant trackage and NYNH&H RR. One 6" pipeline to 3 steel storage tanks. Total capacity 4,760 barrels.	Receipt of scrap iron and fuel oil for plant consumption.
<u>POQUONOCK RIVER</u>					
Hoffman Terminal Co. operated by Michael Hoffman Fuel Co. West Side just below E. Washington Ave. bridge.	Steel sheet pile bulkhead with solid fill.	490'	6' to 13'	5-ton steam locomotive crane, spur track parallel to face of wharf to NYNH&H RR. Three 8" and one 6" pipeline to 16 steel storage tanks. Total capacity 119,047 barrels, open storage area.	Receipt of petroleum products.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	BERTHING SPACE		FACILITIES	USE
		Length	Depth at M.L.W.		
City of Bridgeport (City Wharf) West side above E. Washington Ave. bridge.	Masonry bulkhead, solid fill, with timber pile, tim- ber-decked extension.	119'	6'	Spur track to NYNH RR. open storage area.	Not used for waterborne commerce. Stor- age for city maintenance equipment and materials.
Bridgeport Brass Co. (South Wharf) West side below Grand St. Bridge.	Part masonry and part concrete bulkhead, solid fill, fronted by timber fenders.	300'	14'	Two 6-ton electric overhead traveling cranes. Plant tracks to NYNH&H RR. one 4" pipeline to 9 under- ground steel storage tanks, total capacity 2,500 barrels.	Receipt of bulk cargo and petroleum products for plant consump- tion.
Bridgeport Brass Co. (North Wharf) West side above Grand St. bridge.	Timber pile, timber decked wharf with masonry dolphins in line with face.	180'	14'	Plant tracks to NYNH&H RR. A 6" pipeline to 2 steel storage tanks total capacity 20,000 barrels.	Receipt of fuel oil for plant consumption

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
Irving Byelas West side at end of channel.	Timber pile timber decked offshore platform with timber pile catwalk and pipe trestle. Mooring dolphins.	175'	10' to 12'		Three 6" pipelines to 13 steel storage tanks. Total capacity 15,476 barrels.	Receipt of petroleum products.
S. W. Burritt Co. East side at Grand Street Bridge.	Timber bulkhead, solid fill with timber pile timber decked extension.	720'	10'		Open area used for lumber storage and auto parking.	Not used for water borne commerce.
<u>CEDAR CREEK IN BLACK ROCK HARBOR</u>						
Tidewater Associated Oil Co. West side near Bostwick Ave.	Timber bulkhead, solid fill with timber pile timber decked extension	210'	9' to 12'		Fixed hand operated mast and boom derrick. Three 6" and two 4" pipelines to 5 steel storage tanks, total capacity 19,237 barrels.	Receipt of petroleum products.
Bridgeport Hydraulic Co. West side near Bostwick Avenue	Timber bulkhead, solid fill with timber pile timber decked extension.	280'	7' to 10'		None	No waterborne commerce. Area used as storage yard.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
The Heppenstall Co. West side below foot of Howard Avenue.	Timber bulkhead, solid fill, fronted by moor- ing piles.	145'	6'		Plant trackage to NYNH&H RR. One 6" pipeline to steel storage tank capacity 8,570 barrels.	Receipt of fuel oil for plant consump- tion.
T.A.D. Jones & Co., Inc. 670 Wordin Ave.	Timber bulkhead, solid fill with timber pile timber decked extension.	455'	12' to 16'		Three crawler cranes, spur to NYNH&H RR., open storage for 35,000 tons of coal.	Receipt of coal.
General Chemical Div., Allied Chemical & Dye Corp. West Branch on Wordin Ave.	Timber bulkhead, solid fill with timber pile timber decked exten- sion.	150'	6' to 12'		Spur to NYNH&H RR from tank car loading rack. A 4" pipeline to 2 steel storage tanks Total capacity 213,000 gallons of chemicals.	Receipt of sul- phuric acid and other chemicals.
Bridgeport Gas Light Co. West Branch at foot of Spruce St.	Steel sheet pile bulk- head, fill and 140' of timber pile timber decked apron.	400'	6' to 12'		Crawler crane, elevated hopper and conveyor to gas plant. Spur to NYNH&H RR. A 6" pipeline to 3 steel storage tanks. Total capacity 21,430 barrels. Open coal storage area.	Receipt of coal and fuel oil for plant use.

COMMERCIAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
Esso Standard Oil Co. West Branch Cedar Creek north of Pine St.	Timber bulkhead solid fill fronted by 15' timber platform and mooring dolphins.	200'	12' to 14'		Spur to NYNH&H RR. Five 4" and one 6" pipeline under Wordin Ave. to 5 steel storage tanks, total capacity 34,970 barrels.	Receipt of petroleum products
Socony-Vacuum Oil Co. North side of East Branch	Steel sheet pile bulk- head, solid fill fronted by timber plat- form mooring dolphins.	300'	13' to 15'		Four 6" pipeline to 6 steel storage tanks, total capacity 47,619 barrels.	Receipt of petroleum products.
Sillman & Godfrey Co. North side of East Branch.	Part sheet steel bulk- head and part timber bulkhead, solid fill with timber pile timber decked extension in line with face.	400'	9' to 14'		Crawler crane, spur to NYNH&H RR. Ready-mix concrete plant, open storage area for 2,000 tons of rock, and 1,500 tons of sand and gravel	Receipt of sand, gravel and trap rock.
Sikorsky Aircraft Div. United Aircraft Corp. South side of Cedar Creek.	Timber pile timber decked bulkhead with mooring piles and catwalks ex- tending from both ends in line with face.	450'	16' to 20'	None		Mooring Naval Reserve train- ing vessels.



RECREATIONAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
<u>MAIN HARBOR</u>						
Pequonock Yacht Club 66 California Street West of entrance to Yellow Mill channel.	Timber bulkhead and float.	175'	6' to 18'		Clubhouse and marine service station. Fuel, water, ice. Storage for member boats.	Yacht club member and guest landing. Sale of fuel and water
John Brown Boatyard 40 California Street at entrance to Yellow Mill Channel.	Timber deck and float	100'	6'		Storage yard. Railway for yachts to 40'	Storage and repair of small boats.
Parsell's Boat Yard 421 Seaview Avenue between Cilco and Buckley Bros. ter- minals.	Timber pile timber decked pier with floats.	200'	0' to 8'		Marine service station boat livery. Railway for yachts to 20 tons and 60 feet.	Sale of fuel and water, fishing supplies, charter of boats.

RECREATIONAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

BERTHING SPACE						
NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	Depth at		FACILITIES	USE
			M.L.W.			
Bill's Seaview Ave. East of Parsell's Boat Yard.	Timber pile timber decked pier with floats.	200'	0'	to 8'	Boat livery	Sale and rental of fishing supplies, tackle and boats

JOHNSONS RIVER

Miamogue Yacht Club Seaview Ave.	Timber bulkhead with solid fill and timber pile, timber decked wharf with floats.	300'	6' to 15'		Clubhouse and marine service station. Fuel, water, ice. Storage for member's boats. Railway for yachts to 50 tons and 40 feet.	Yacht club members and guests land- ing. Sale of fuel and water.
Luciano's Boatyard 12 Bay Street					Storage and repair yard. Railway for yachts to 30'.	Storage and repair of small craft.
East End Yacht Club Bay Street	Timber pile timber decked pier with float.	40'	8'		Clubhouse	Yacht club members and guest landing.

RECREATIONAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at M.L.W.			
<u>POQUONOCK RIVER</u>						
City of Bridgeport Public Landing. Just above Strat- ford Ave. Bridge.	Timber pile, timber decked pier with 40'x 50' float.	50'	6'		None	Public landing for small craft.
<u>BLACK ROCK HARBOR</u>						
Black Rock Yacht Club.	Timber pile, timber decked pier with timber float.	40'	6'		Clubhouse, swimming pool, tennis courts.	Yacht club members and guests landing.
Naval Vets Port No. 5 Inc. Brewster Street	Concrete posts, timber deck pier with timber float.	40'	10'		Clubhouse, boat storage.	Yacht club members and guest landing.

RECREATIONAL PORT AND TERMINAL FACILITIES  
BRIDGEPORT HARBOR, CONNECTICUT

NAME AND LOCATION	TYPE OF CONSTRUCTION	Length	BERTHING SPACE		FACILITIES	USE
			Depth at	M.L.W.		
Fayerweather Yacht Club Brewster Street	Masonry bulkhead with timber float.	30'	10'		Clubhouse, boat storage, inclosed basin for skiffs, Marine service station.	Yacht club members and guest landing Sale of fuel and water.
Black Rock Shipyard at entrance to Burr Creek					Storage yard for about 50 boats. Railway for yachts to 40'. Mobile crane.	Storage and repair yard.
Fayerweather Shipyard on Burr Creek	Steel sheet pile bulkhead solid fill.	40'	3'		Storage yard for about 60 boats. Railway for yachts to 40'. Stiff leg crane.	Storage and repair yard.
Joel J. Johnson Boatyard 20 Arthur Street at head of Burr Creek.	Timber pile timber decked pier with float.	40'	10'		Storage and construc- tion yard. Carpenter shop. Railway for yachts to 50'.	Construction, fitting out and repair of yachts.

22. All deep craft commerce in Bridgeport Harbor at the present time is concentrated at three terminals located on the main channel: the United Illuminating Company wharf located on the east side of the main harbor below Stratford Avenue Bridge; the Cilco Terminal, located on the east side, east of Yellow Mill Channel; and the terminal of Buckley Brothers, Inc. located on the east side, west of Pleasure Beach Bridge, at the entrance to Johnson's River. The terminal of the United Illuminating Company, with 1,295 feet of berthing space in 16 and 30-foot depths at mean low water, provides the longest single berthing area in Bridgeport Harbor. The terminal is used for the receipt of coal and oil for power plant consumption, and is provided with oil storage capacity for 20,000 barrels, and a 300 by 600-foot coal storage area. The Cilco Terminal, owned and operated by the City Lumber Company of Bridgeport, provides 970 feet of berthing space with depths of 30 to 31 feet. Used by the lumber company for the receipt of lumber, this is a public terminal open to any ship, and is equipped to load and unload lumber and other bulk cargoes and general package freight. Both covered and open storage are available. The timber pile, offshore pier of Buckley Brothers, Inc., with 600 feet of berthing space in depths of 32 and 33 feet at mean low water, is used for the receipt and shipment of petroleum products, and for bunkering vessels. Equipped with four 12" pipelines to a total of 23 storage tanks with a combined capacity of 1,910,000 barrels, this terminal provides the largest facility in Bridgeport for the handling and storing of petroleum products.

23. In addition to these three deep draft terminals presently in use, the United Illuminating Company plans the construction of another large, deep draft pier to be located on the west side of the main channel, opposite Steel Point to serve the new power plant now under construction. This terminal will be used for the receipt of coal and oil for fuel plant consumption.

24. The extensive recreational boating in Bridgeport Harbor is provided for by 14 small boat terminals, including 4 small boat terminals in the main harbor, 3 on Johnsons River, 1 on the Poquonock, and 6 in Black Rock Harbor. In addition to storage and repair facilities, there are, in all, 6 yacht clubs located in the harbor; the Poquonock Yacht Club, located in the main harbor west of the entrance to Yellow Mill Channel; the Miamogue and East End Yacht Clubs on Johnsons River; and the Black Rock and Fayerweather Yacht Clubs, and Naval Vets Port No. 5, Inc. located in Black Rock Harbor. These clubs all provide landing facilities for guests as well as members, with wharves ranging from 40 feet with a depth of 6 feet at mean low water at the Black Rock Yacht Club, to 300 feet with depths of 6 to 15 feet at the Miamogue Yacht Club on Johnsons River. In addition, the City of Bridgeport operates a public landing for small boats with a 40 by 50-foot float with a depth of 6 feet at mean low water, located just above Stratford Avenue Bridge on the Poquonock River.

### IMPROVEMENT DESIRED

25. In order to obtain the views of interested parties with respect to improvement of Bridgeport Harbor, a public hearing was held in Bridgeport, Connecticut on December 15, 1949. The hearing was attended by about 44 representatives of the State of Connecticut and the City of Bridgeport, of shipping, oyster cultivating, and other business interests, and of yachting interests. Representatives present requested widening and deepening of the main harbor channel to provide more adequate facilities for deep-draft shipping, and the improvement of Black Rock Harbor as a harbor of refuge for small craft.

26. Representative of the City of Bridgeport, and of the Bridgeport Chamber of Commerce, the Harbormaster, the Commissioners of Steamship Terminals, and of the Cilco Terminal Co., Inc., and Buckley Bros. Inc. requested that the main channel into Bridgeport Harbor be widened from its present 400 feet to 600 feet, and deepened from its present 30 feet to either 35 or 40 feet. It was stated that greater depth is needed because present vessel traffic is subject to costly tidal delay, and that a wider channel is needed because the fact that prevailing winds are 90 degrees to the channel make the 400-foot channel difficult to navigate. Proponents of the improvement claimed that since there is danger of deep draft shipping grounding in the channel, and that since grounded ships are subject to additional delay until checked by U. S. Inspectors, some steamship lines avoid Bridgeport. Proponents expressed the belief that a deeper and wider channel, by reducing delay and the risk of damage, would increase the cargo shipments to the port.

27. The Secretary of Commissioners of Steamship Terminals for the State Pier at New London, Connecticut, noted the trend toward increased draft in tankers in use, and expressed the opinion that an increasing amount of future oil commerce will consist of foreign imports, with a consequent tendency of oil companies to use larger ships. This representative cited Bridgeport as having the largest storage for oil in the state of Connecticut, and stated that a substantial percentage of the present oil commerce in Bridgeport Harbor consists of foreign imports.

28. The Mayor of Bridgeport and a representative of the Bridgeport Chamber of Commerce stated that the continued industrial development of both the City of Bridgeport and of the State of Connecticut depended on the further improvement of Bridgeport Harbor. They observed that the trend toward the use of larger vessels is increasing and claimed that some of the larger lines avoid using the Bridgeport channel in its present condition.

29. A representative of the Cilco Terminal Company, Inc., stated that improvement of the channel would increase lumber receipts from the 17,000,000 feet received in 1949 to 50,000,000 feet annually, thus tripling present lumber commerce. It was also claimed that improvement would permit the addition of 30,000 tons of general cargo annually at the Cilco Terminal.

As a consequence, it was stated, the Cilco Terminal Co. would hire 50 additional people and spend \$100,000 for warehouses to take advantage of the channel improvement.

30. A representative of Buckley Bros. Inc., the principal petroleum dealers in Bridgeport, stated that their company operated one of the largest petroleum storage facilities in New England and shipped into five states. He stated that annual delay expenses of shipping, consequent upon the fact that with the present channel depth tankers must wait for sufficient tide before entering the channel, ranges from \$35,000 to \$50,000 annually. This representative further claimed that the development of super-tankers with drafts of 34 and 35 feet indicated the need for a 40-foot channel. It was noted that super-tankers carry twice as much cargo, 20 to 25 percent faster, at one third less cost than the T-2 tankers presently being used. It was stated that if all the company's petroleum products were shipped in super tankers, the annual savings in transportation costs would be from \$720,000 to \$840,000, and that if only one half of the products were shipped in super tankers, the annual savings would be from \$360,000 to \$420,000.

31. The Long Beach Improvement Association of Stratford, Connecticut, requested, by a letter read at the hearing, that spoil be placed on Long Beach to improve the beach and prevent further erosion.

32. An industrial real estate broker stated that spoil from dredging could be placed on Stratford Meadows, and would thereby provide suitable industrial areas, and increase land values on approximately 800 acres of land by about \$1,000 per acre.

33. A representative of the H.J. Lewis Oyster Company opposed any dredging in Bridgeport Harbor, claiming that such dredging would damage seed oyster beds in the harbor. Bridgeport Harbor, it was stated, is one of the largest areas for cultivating seed oysters in New England. It was claimed that dredging operations cause the seed beds to silt up, and would cause damages to the industry in Bridgeport greater than the commercial benefits resulting from deepening the channel. It was stated, however, that such damages could be reduced if the oyster industry were given one year's advance notice of dredging operations.

34. In addition to the improvement of the main channel in Bridgeport Harbor, improvement of Black Rock Harbor as a harbor of refuge was favored by representatives of the city of Bridgeport, the Chamber of Commerce, local yacht clubs, yachtsmen, boat yard owners and other local business men. Improvements specifically proposed at the hearing were two breakwaters, one on each side of the entrance of Black Rock Harbor, and a 6 and 8-foot mooring basin of about 45 acres to be located on the east side of the main channel in Black Rock Harbor, in front of a proposed municipal yacht club. It was stated that at the present time there are three yacht clubs with a total membership of over 675 members in Black Rock Harbor, and that available anchorage

is crowded and relatively unprotected. It was claimed that the harbor is not only an attractive location for recreational boating, but that inasmuch as it is located about halfway between Duck Island Roads and Stamford Harbor in an area where there is at present no desirable port of refuge, its development as a harbor of refuge would be of general benefit. At present, it was claimed, the harbor is difficult to enter and offers little protection in southerly blows. If proper protection for the harbor entrance were provided and ample anchorage made available, it was claimed the improvement would fulfill a need for an additional harbor of refuge on Long Island Sound.

35. A representative of the Black Rock Harbor Businessmen's Association favored improving the harbor as a civic improvement which would make the city a more attractive place for residents and industry and would bring commercial benefits from increased visitors and general use.

36. A representative of two shipyards in Black Rock Harbor expressed desire for a channel 7 feet deep and 100 feet wide in Burr Creek, extending from the main channel in Black Rock Harbor to Yacht Street. At present shipyards in this area cannot handle boats with drafts in excess of 3 feet except at high tide. The desired improvement of the channel, it was claimed, would allow one shipyard to triple its present annual volume of business from \$32,000 to \$100,000 by making possible the movement of larger boats to the yard, and permitting the movement of smaller boats on any tide. It was stated that the shipyard owners believe if the harbor is improved and the channel in Burr Creek maintained, the harbor will become increasingly important not only to the City of Bridgeport but to yachtsmen on Long Island Sound.

37. Improvement of Black Rock Harbor as a harbor of refuge was also favored by a total of 41 letters presented at the hearing, 18 from yacht clubs, 21 from individual boat owners, and 2 from yacht service companies.

38. A representative of the firm of Frank M. Flower, growers of oysters, objected to improvement of Black Rock Harbor. It was stated that dredging in the harbor would damage seed oyster beds in the harbor, and that construction of breakwaters would discourage the setting of oysters and other shellfish, and would destroy setting grounds which has produced \$500,000 worth of oysters set between 1943 and 1949.

39. A letter from Joseph Savage, of the Black Rock Shipyard, objected to further dredging unless his property was protected by bulkheads to prevent erosion.

40. Proposal to provide anchorage for recreational craft in Burr and Cedar Creeks was evolved since the time of the public hearing. The desired anchorage in Burr and Cedar Creeks would provide about 28 acres of protected mooring area north of Seaside Park. Such a mooring basin is a part of the City's long range plans to construct an incinerator and develop a public park on the present site of the city dump and on city



land north of Burr Creek. At a conference on May 18, 1955, Mayor McLevy stated that he thought it would be practical to develop a water taxi service across Cedar Creek, thereby saving people the long trip through the city to reach bathing beaches on Seaside Park. The city tax officials stated that they believed the proposed anchorage would permit boats, now based and taxed in Westport, Southport and on the Housatonic River because there is not room for them in Bridgeport, to be moved closer to their homes.

41. The boat yard owners on Burr Creek, and the Commander of the U. S. Coast Guard Auxiliary, Flotilla 711, expressed the opinion that the proposed anchorage in Burr and Cedar Creeks would quickly be filled with boats from less protected and more distant areas. The Commodores of the Fayerweather and Black Rock Yacht Clubs, and the Commander of the Naval Vets Post No. 5 stated however that an anchorage in Burr Creek would be used by their members only for storm protection.

42. The owner of the Black Rock Shipyard expressed the opinion that although an anchorage in Burr Creek would be good for his business, the area was too small to be worth developing. He further stated that he believed boat owners would not use the area because of the open city dump and the danger of damage by vandals.

43. All local interests stated that the proposed anchorage in Burr and Cedar Creeks fulfilled the needs of recreational craft in Black Rock Harbor less adequately than the provision of protective breakwaters at the harbor entrance.

44. Subsequent to the hearing in 1949, interest was expressed in two improvements for recreational craft in Johnsons River. Members of the Miamogue Yacht Club requested the removal of the old pilings of the former Lake Torpedo Boat Company ways on the west side of Johnsons River, and the dredging of this area and the shallow inshore areas on the east side of the river opposite the yacht club to provide more anchorage area. Members of the yacht club claimed that relocation of channel buoys in Johnsons River closer to the eastern shore has reduced available anchorage area so that it is necessary for the first row of their larger boats to extend beyond the channel limit when they are at anchor.

45. Members of the East End Yacht Club requested modification of the existing Federal project for Johnsons River to restore it to the original Federal project adopted in 1899. This project provided for a channel 9 feet deep and 100 feet wide to the head of navigation, about 100 feet below Hollisters dam. Members of the yacht club claim that the 600-foot extent between the present upper limit of the Federal project and Hollisters Dam has for many years been used as a small boat anchorage, but that silt dumped at the head of the river has been carried downstream with the tide, causing the area to shoal until it is now unusable except at high tide.

## COMMERCE

46. Shipment and receipts in Bridgeport Harbor have averaged approximately 2,250,000 short tons annually from 1950 through 1954 inclusive. Based on figures for 1954, the latest year for which statistics are complete, about 80 percent of this commerce consists of petroleum products, with receipts amounting to approximately 1,380,000 tons and shipments amounting to approximately 370,000 tons. Approximate 1954 tonnages for other major items of commerce are: coal, 230,000 tons; metals and manufacturers, 40,000 tons; sand and gravel, 60,000 tons; and lumber, 60,000 tons. Ferry traffic between Bridgeport and Port Jefferson, New York dropped from a high of 260,000 persons a year in 1947 to about 70,000 in 1954. The number of automobiles carried by ferry increased from 5,000 to 28,000 in 1953 and dropped to 12,000 in 1954. Receipts and shipments of commodities at Bridgeport Harbor for the period from 1945 through 1954 are shown in the following table.

RECEIPTS AND SHIPMENTS

BRIDGEPORT HARBOR, CONNECTICUT  
(Including Black Rock Harbor)  
(in short tons)

Commodity	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Fish and shellfish	6,726	5,056	1,281	795	1,702	3,860	1,388	2,074	2,299	252
Inedible animal products	-	-	1,079	68	1,934	900	3,050	2,601	0	523
Lumber	-	12,458	25,917	6,106	25,670	69,820	27,152	14,216	55,337	57,700
Coal and coke	1,432,117	1,314,403	1,296,905	677,426	176,042	156,669	261,925	329,033	208,143	234,062
Petroleum products	420,033	571,327	877,228	1,028,552	1,212,506	1,850,205	1,671,795	2,010,493	1,750,671	1,747,152
Sand, gravel and rock	42,441	61,277	107,340	107,218	73,656	88,664	93,596	67,075	58,734	60,361
Metal and mnfrs.	80,432	34,695	48,651	70,648	58,581	91,001	97,067	95,914	102,657	42,265
Chemicals	9,013	10,287	1,343	3,235	4,455	3,199	2,939	2,663	7,175	8,128
Miscellaneous	108	208	1,794	55	98	1,180	615	3,563	505	13,211
T o t a l	1,990,870	2,009,716	2,361,538	1,894,103	1,554,644	2,265,498	2,159,527	2,527,632	2,185,521	2,163,654
No. of passengers	176,069	173,449	263,483	236,200	141,613	88,920	112,750	178,781	78,357	70,017
No. of autos of passgrs.	8,200	11,309	7,971	10,907	4,900	10,602	12,456	25,916	28,304	12,191

47. Of the total commerce in Bridgeport Harbor during 1954, about 1,700,000 tons, or approximately 78 percent, consisted of receipts of coal, petroleum products, and lumber in the main harbor. About 43 percent of the total tonnage received at Bridgeport is brought into the main harbor in vessels drawing between 25 and 30 feet. A detailed breakdown of 1953 commerce indicated that 32 percent of the total tonnage received consisted of petroleum products brought in by 33 tanker trips drawing 30 feet or over. Ten of these ships brought Bunker C oil from outside the United States and the remaining 23 delivered fuel oil, kerosene, and gasoline from Gulf ports. Over 90 percent of the coal delivered to Bridgeport in 1953 was received from Virginia in 17 trips by colliers drawing between 28 and 31 feet.

#### VESSEL TRAFFIC

48. During the past 10 years the number of vessel trips of greater than 25-foot draft in and out of Bridgeport Harbor has generally increased from 24 in 1944 to 69 in 1954, and has averaged 70 since 1950. In addition there are annually some 4000 to 8000 vessel trips by small barges, motor vessels, and steamers. This total vessel traffic includes about 600 vessel trips made in Black Rock Harbor.

49. Of the deep draft vessels entering the main channel in Bridgeport Harbor in 1953, 35 were tankers drawing more than 28 feet, 24 of these being from the Gulf Coast ports, and 11 from foreign ports. There were 17 colliers drawing more than 28 feet, all originating from Virginia. There were 8 lumber vessels drawing over 27 feet, 5 of these being from foreign ports and drawing over 28 feet, and 3 from Oregon, drawing 27 feet. Vessel traffic for the 10 year period 1944 through 1954 is shown in the following table:

#### VESSEL TRAFFIC

##### BRIDGEPORT HARBOR, CONNECTICUT (Including Black Rock Harbor)

Draft	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
33	-	-	-	-	-	1	-	-	-	-
32	-	-	-	-	-	5	2	4	3	5
31	-	-	-	2	3	14	22	15	22	19
30	-	-	-	9	13	12	14	27	11	13
29	-	-	-	5	4	7	19	23	16	22
28	20	23	125	13	15	6	5	1	5	4
27	-	-	-	15	3	10	-	1	4	4
26	-	-	30	8	3	3	2	6	-	2
Total over 25 feet	20	23	155	52	41	58	64	77	61	69
Under 25 feet	6,710	7,671	4,661	6,578	6,085	7,400	4,536	5,027	4,409	4,111
TOTAL	6,730	7,694	4,816	6,630	6,126	7,458	4,600	5104	4,470	4,180

50. The maximum registered loaded draft of the ships using Bridgeport Harbor is 30.2 feet. Vessel trips of greater draft in the above table are in excess of registered drafts, and are either in error or may be recorded while ship is underway, taking into account squat underway and uneven loading

#### DIFFICULTIES ATTENDING NAVIGATION

51. The principal difficulties attending navigation in Bridgeport Harbor are those of tidal delay to deep-draft shipping waiting to insure adequate clearance under the keel for safe navigation. A further condition cited is the prevalence of winds normal to the channel, making it difficult to keep the large deep-draft ships within the limits of the 400-foot wide channel.

52. The vessels affected are T-2 tankers that are over 500 feet long and have a loaded draft of 30 feet, coal colliers with a loaded draft of about 29 feet, and cargo ships bringing lumber that have a draft of about 28 feet. These vessels must wait for the tide to navigate the main channel into Bridgeport Harbor when fully loaded. At least two vessels have grounded since the main channel was dredged to its 400-foot width and 30-foot depth. The reasons given for grounding were shoaling of the channel, and failure to navigate the channel.

53. Black Rock Harbor is exposed to winds from SE to SW which make it an uncomfortable anchorage for small boats. Winds blow from the southeast during 7 percent of the boating season, May to September, with an average velocity of about 12 miles per hour. Southerly winds occur during 19 percent of the boating season with an average velocity of about 13 miles per hour. Southwesterly winds occur during 18 percent of the boating season with an average velocity of 13 miles per hour. High winds between S and SE can produce waves 6 to 10 feet high in Black Rock Harbor. The harbor is protected by Penfield Reef against high waves from that direction but high winds between S and SW can produce waves from two to three feet high. High winds that produce dangerously high waves probably occur only during storms but above average winds which produce two or three-foot waves in the harbor, occur during 20 percent of the boating season. These smaller waves sweep the full length of the harbor and reduce its suitability as a small boat harbor. Large waves that are dangerous to small boats occur in the outer half of the harbor.

#### WATERPOWER AND OTHER SUBJECTS

54. There are no matters of flood control or water power pertinent to this report. The navigation improvements considered will have no effect on pollution.

55. The approaches to Bridgeport Harbor and Black Rock Harbor are used for the cultivation of oysters. Permanent damage to the industry is unlikely. Local interests have indicated that dredging causes temporary

silting of the oyster beds. It is claimed that damage would be reduced if the oystermen were notified a year in advance of dredging operations so that they would have time to remove the oysters from the affected area. A claim for \$150,000 in damages to the oyster industry due to improvement dredging of Bridgeport Harbor in 1950 resulted in a court judgement of about \$7,000.

56. At the public hearing it was claimed that the material dredged from the channel could be deposited hydraulically on the Stratford Meadows thus reclaiming land. However, the present dredging by the Connecticut State Highway Department of a deep hole in the harbor and deposit of the material on the Stratford Meadows modifies that condition. The Highway filling will result in some reclaimed land, with good fill, and in other areas of waste fill. It is on these latter areas that the mud from the inner harbor would be placed. It is not expected that there would be any deposit of dredged material from the proposed project on wildlife habitat, and no adverse effect on wildlife is expected to result from the project.

#### PLANS OF IMPROVEMENT

57. Main Channel. - Consideration has been given to the desired improvement of the existing 30-foot main channel for deep-draft vessels by deepening it to 35 or 40 feet. The large cost of deepening the channel to 40 feet, an additional \$1,700,000, or just about double the cost of the 35-foot channel, and lack of additional benefits that would accrue to a 40-foot channel but not to a 35-foot channel became apparent early in the project study and resulted in dismissal of the plan of a 40-foot channel from further serious consideration. Consideration was also given to provision of channel depths of 34 and 37 feet.

58. Similarly although consideration was given in the early stages of the study to plans including the desired widening of the channel from its present 400-foot width to a width of 600 feet it became readily apparent that the tremendous additional cost involved could not be justified by resultant additional benefits. A channel 600 feet wide instead of the present 400 feet wide would cost an additional \$850,000 to \$2,100,000, depending on the channel depth considered. Standard channel design indicates the present channel width of 400 feet to be sufficient for the largest vessels using Bridgeport Harbor, even under condition of two ships passing in the channel, which would be of relatively rare occurrence in view of the anticipated annual volume of commerce and annual number of deep-draft vessel trips in the harbor. The claim by local navigators that a prevailing quartering wind necessitated greater channel width to insure safe navigation is not considered to be borne out by recorded damages of sufficient severity and extent to warrant the large additional cost of a channel widening.

59. Black Rock Harbor Breakwaters. - A plan of improvement of Black Rock Harbor to provide anchorage and protection for recreational craft has been considered. The improvement would consist of two breakwaters at the entrance to Black Rock Harbor. Alternative breakwater locations and layouts have been studied. In the system that would provide greatest protection, the east breakwater would extend 800 feet westerly from a point near the end of Fayerweather Island. The west breakwater would extend 1,050 feet southeasterly from the west shore. A more economical breakwater system could be constructed about 500 feet north of the above system. The east breakwater would be 900 feet long and the west 650 feet long. The breakwaters would be constructed to a height 10 feet above mean low water (about 3 feet above mean high water) with a top width of 8 feet and side slopes of 1 on 1 on the harbor side and 1 on 1.5 on the seaward side.

60. In the earlier stages of the study, local interests expressed a desire for a dredged anchorage on the east side of Black Rock channel between the channel and Fayerweather Island. The anchorage would extend about 4,000 feet in a north-south direction and about 900 feet east and west. About  $2/3$  of the area would be dredged to 8 feet below mean low water, the remainder to 6 feet below mean low water. However, as the study progressed, it became apparent that with the proposed breakwater protection, there would be harbor areas of adequate natural depths for anchorage purposes, sufficient for the anticipated harbor use, and the cost of harbor dredging to provide additional area would serve no useful purpose at this time.

61. Burr Creek Anchorage. - A plan of improvement has been considered to provide sheltered anchorage for smaller pleasure craft at Burr and Cedar Creeks in upper Black Rock Harbor. The improvement would consist of modifying the existing project to abandon the 7-foot Burr Creek channel and dredging a 28-acre mooring area 6 feet deep in Burr Creek and on each side of Cedar Creek, near Burr Creek.

62. Upper Johnsons River Anchorage. - A plan of improvement was considered at the upper end of Johnsons River to provide anchorage for recreational craft. The improvement would consist of an anchorage of about 2 acres between Hollisters Dam and Johnsons River channel. The anchorage would be dredged to 6 feet below mean low water.

63. Lower Johnsons River Anchorage. - Improvement of Johnsons River near the Miamogue Yacht Club to provide anchorage for recreational craft was also considered. The improvement would consist of modifying the existing project for Johnsons River opposite and northerly of the Miamogue Yacht Club by changing the channel alignment by reducing the channel width to provide a 3 acre anchorage area 6 and 9 feet deep, on the west side of the channel. The anchorage would extend about 800 feet in a north-south direction and about 200 feet east and west.

### SHORE LINE EFFECTS

64. The main channel has been improved to various depths in the past with no perceptible change in the configuration of the shoreline. It is concluded that the deepening of the main channel of Bridgeport Harbor as considered in this report would have no appreciable effect on the shoreline. The request by local interests that material dredged from the channel be placed on Long Beach to combat erosion although possible is not considered to be reliably assured, as the material in the channel is of doubtful suitability for that purpose, and the additional cost involved eliminates such shore disposal as a direct beneficial result of the project. The anchorage improvements proposed for upper Johnsons River consists of dredging to a depth of 6 feet, primarily within an area dredged at one time to a depth of 9 feet, therefore having no probable effect on adjacent shores. The anchorage improvement in the lower river does not require dredging within 150 feet of shore, and therefore no change in the shore line is anticipated.

65. It is not considered that the construction of breakwaters to protect Black Rock Harbor will have any significant effect on shore lines in the area. The breakwaters will tend to stabilize the extents of shore protected and reduce erosion now occurring.

66. One of the local interests opposed dredging at Burr Creek for fear it would cause erosion of the shore. However, the proposed anchorage within Burr Creek is 75 feet from the Harbor Lines, and therefore, not expected to result in any erosion of the shore. That part of the proposed anchorage east of the Cedar Creek channel opposite Burr Creek contemplates a relocation of the Harbor Line shoreward, but again the dredging is at least 100 feet offshore and is not expected to affect the shore line.

### AIDS TO NAVIGATION

67. The United States Coast Guard has been consulted and has advised that additional aids to navigation will be required to mark the main channel and anchorages as noted below:

<u>Improvement</u>	<u>Additional Navigation Aids</u>	<u>First Cost</u>	<u>Annual Maintenance</u>
Main Channel	1 Buoy	\$ 400	\$ 100
Black Rock Breakwaters	1 Automatic Light 1 Buoy	4,000	200
Lower Johnsons River	2 Buoys	400	100



## ESTIMATES OF FIRST COST

68. Estimates of first cost have been prepared for the various plans of harbor improvement considered in this report and for the alternative plans studied. Probings and sample borings were made in the hydrographic survey of the harbor to determine the relative hardness of the material to be dredged, the existence and extent of submerged rock areas and to determine the foundation conditions where breakwaters were considered. Except for a small area of boulders in the upper limits of Johnsons River, all proposed dredging would be of ordinary material, consisting of mud, sand and gravel. Dredging quantities are in terms of in-place measurement and provide for dredging to the proposed project depth plus an allowance of two feet for over depth in the main channel and turning basin and one foot for over depth in all other areas. Side slopes of 1 vertical on 3 horizontal were used. Unit prices are based on prices prevailing in the 1955 construction season, and on removal of material by contract dredging. The base unit cost for deep-draft dredging in the main channel using a bucket dredge and disposal at sea, was estimated at \$0.65 per cubic yard. The base unit cost for deep-draft dredging in the main channel by the hydraulic method was estimated at \$0.48 per cubic yard. The unit cost for stone for the breakwater was estimated at \$9.00 per ton. The cost of stone for construction of the breakwater is based upon the stone being brought in by barge and placed by lighter. Land based construction would result in lower unit costs, but would require larger volumes and result in no significant difference in total cost. The estimates include allowances for contingencies.

69. Main Channel. - Estimates are based on dredging by the most economical means. The inner portion of the main channel would be dredged to a point about one-half mile outside the harbor entrance breakwater by hydraulic dredge with spoil wasted on the Stratford Meadows east of Johnsons River. The remainder of the material in the outer part of the channel would be removed by bucket dredge and disposed of in the dumping ground in Long Island Sound. The estimated quantities are as follows:

Main channel depth	34'	35'	37'
Quantity to be removed by hydraulic dredge (cu.yds.)	1,350,000	1,550,000	1,800,000
Quantity to be removed by bucket dredge (cu.yds.)	900,000	1,160,000	1,700,000
	<hr/> 2,250,000	<hr/> 2,710,000	<hr/> 3,500,000

70. The estimated first cost of the three main channel improvement plans are shown below:

		<u>Channel Depth</u>		
A.	<u>Federal</u>	34'	35'	37'
(1) Corps of Engineers:				
a.	Channel Dredging	\$ 1,240,000	\$1,500,000	\$ 2,000,000
b.	Engineering and Design	40,000	50,000	70,000
c.	Supervision and Administration	120,000	150,000	200,000
d.	Total	\$ <u>1,400,000</u>	\$ <u>1,700,000</u>	\$ <u>2,270,000</u>
(2) U.S. Coast Guard:				
	Aids to Navigation	<u>400</u>	<u>400</u>	<u>400</u>
(3)	Total Federal Cost	\$ 1,400,400	\$1,700,400	\$ 2,270,400
B.	<u>Non-Federal</u>			
(1) Local Interests				
	Berth Improvements	<u>25,000</u>	<u>30,000</u>	<u>40,000</u>
C.	Total	\$ 1,425,400	\$1,730,400	\$ 2,310,400

71. Black Rock Harbor Breakwaters. - The two proposed breakwaters at the outer location are estimated to require 63,000 tons of riprap, and at the inner location are estimated to require 48,000 tons of riprap. The estimates of first costs of the improvements are as follows:

	<u>Outer Breakwater System</u>	<u>Inner Breakwater System</u>
Project Construction:		
Breakwater construction: Furnishing and placing stone at \$9.00 per ton	\$ 570,000	\$ 430,000
Engineering and design	15,000	12,000
Supervision and administration	45,000	38,000
Total project construction cost	\$ 630,000	\$ 480,000

	Outer Breakwater System	Inner Breakwater System
Other Construction		
(a) Aids to navigation: Establishing buoys and lights	\$ 4,000	\$ 4,000
(b) Public landing: Constructing wood pile and timber wharf	<u>5,000</u>	<u>5,000</u>
Total estimated project cost	\$ 639,000	\$ 489,000

72. Anchorages. - The base unit cost for shallowdraft dredging of the proposed pleasure-boat anchorages is estimated at \$0.75 per cubic yard for the Burr Creek Anchorage, and in view of the extremely limited volumes of dredging involved \$1.10 per cubic yard for dredging the Johnsons River anchorages. The estimates of first costs of the improvements are as follows:

BURR CREEK ANCHORAGE - 6-foot anchorage for small boats in Burr and Cedar Creeks.

Project Construction:

Anchorage: Dredging 280,000 cubic yards of material at \$0.75	\$ 210,000
Engineering and design	6,000
Supervision and administration	<u>19,000</u>
Total project construction cost	\$ 235,000

Other Construction:

(a) Aids to navigation	\$ 0
(b) Public Landing: Constructing wood pile and timber wharf	<u>5,000</u>
Total estimated project cost	\$ 240,000

UPPER JOHNSONS RIVER ANCHORAGE - 6-foot anchorage at head of Johnsons River.

Project Construction:

Anchorage: Dredging 17,000 cubic yards of material at \$1.10	\$ 19,000
Engineering and design	500
Supervision and administration	<u>1,500</u>
Total project construction cost	\$ 21,000

Other Construction:

(a) Aids to navigation	0
(b) Public Landing: Constructing wood pile and timber wharf	<u>5,000</u>
Total estimated project cost	\$ 26,000

LOWER JOHNSONS RIVER ANCHORAGE - 6 and 9-foot anchorage west of the 15 foot channel on Johnsons River.

Project Construction:

Anchorage: Dredging 4,000 cubic yards of material at \$1.10	\$ 4,500
Engineering and design	100
Supervision and administration	<u>400</u>
Total project construction cost	\$ 5,000

Other Construction:

(a) Aids to navigation	\$ 400
(b) Public Landing: Constructing wood pile and timber wharf	<u>5,000</u>
Total estimated project cost	\$ 10,400

## ESTIMATES OF ANNUAL CHARGES

73. The estimated annual carrying charges have been computed on an assumed life of 50 years and at an interest rate of 2.5 percent. The annual charges on improvement of the main harbor channel have been computed on the basis that the cost of the channel improvements will be entirely borne by the United States and the berth improvements entirely by local interests. The annual charges on the plans for recreational small boat improvements have been computed on the basis that local interests will contribute in cash a portion of the cost of the improvement and will provide suitable public landings, the total costs to be borne by local interests to be commensurate with that portion of the benefits that are local in nature.

### ESTIMATES OF ANNUAL CHARGES- MAIN CHANNEL

#### BRIDGEPORT HARBOR, CONNECTICUT

Main channel depth	34'	35'	37'
1. <u>Federal Investment</u>			
a. Construction (Corps of Engineers)	\$ 1,400,000	\$ 1,700,000	\$ 2,270,000
b. Aids to navigation (Coast Guard)	<u>400</u>	<u>400</u>	<u>400</u>
Total	\$ 1,400,400	\$ 1,700,400	\$ 2,270,400
2. <u>Non-Federal Investment</u>			
a. Berth improvements private terminals	<u>25,000</u>	<u>30,000</u>	<u>40,000</u>
3. <u>Total Investment</u>	\$ 1,425,400	\$ 1,730,400	\$ 2,310,400
4. <u>Federal Annual Carrying Charge</u>			
<u>Corps of Engineers</u>			
a. Interest	\$ 35,000	\$ 42,500	\$ 56,800
b. Amortization	14,400	17,400	23,300
c. Estimated cost of additional annual channel maintenance	4,000	5,000	6,000
<u>U.S. Coast Guard</u>			
d. Maintenance of aids to navigation	<u>100</u>	<u>100</u>	<u>100</u>
e. Total	\$ 53,500	\$ 65,000	\$ 86,200

5. Non-Federal Annual Carrying Charge

a. Interest on private investment	\$ 600	\$ 800	\$ 1,000
b. Amortization of private investment	300	300	400
c. Estimated cost of additional berth maintenance	<u>200</u>	<u>200</u>	<u>300</u>
d. Total	\$ 1,100	\$ 1,300	\$ 1,700

6. Total Annual Carrying Charge

a. Federal annual carrying charge	\$53,500	\$ 65,000	\$ 86,200
b. Non-Federal annual carrying charge	<u>1,100</u>	<u>1,300</u>	<u>1,700</u>
c. Total	\$54,600	\$ 66,300	\$ 87,900

# ESTIMATE OF ANNUAL CHARGES - RECREATIONAL IMPROVEMENTS

## BRIDGEPORT HARBOR, CONNECTICUT

	BLACK ROCK HARBOR		BURR CREEK	UPPER JOHNSONS	LOWER JOHNSONS
	Inner	Outer	ANCHORAGE	RIVER ANCHORAGE	RIVER ANCHORAGE
	Breakwater	Breakwater			
<u>Federal Investment</u>					
Construction cost: Corps of Engrs.	\$231,000	\$ 306,000	\$ 80,000	\$ 11,600	\$ 5,000
Aids to navigation: Coast Guard	4,000	4,000	0	0	400
Total	\$235,000	\$ 310,000	\$ 80,000	\$ 11,600	\$ 5,400
<u>Non-Federal Investment</u>					
Construction cost: local interests	\$249,000	\$ 324,000	\$ 155,000	\$ 9,400	\$ 0
Public Landing	5,000	5,000	5,000	5,000	5,000
Total	\$254,000	\$ 329,000	\$ 160,000	\$ 14,400	\$ 5,000
<u>Total Investment</u>	\$489,000	\$ 639,000	\$ 240,000	\$ 26,000	\$ 10,400
<u>Federal Annual Carrying Charge</u>					
Corps of Engineers:					
Interest	\$ 5,750	\$ 7,700	\$ 2,000	\$ 290	\$ 125
Amortization	2,400	3,100	800	120	50
Maintenance	1,000	1,000	3,000	300	200
Total	\$ 9,150	\$ 11,800	\$ 5,800	\$ 710	\$ 375
U. S. Coast Guard:					
Interest	\$ 100	\$ 100	\$ 0	\$ 0	\$ 10
Amortization	50	50	0	0	4
Maintenance	200	200	0	0	100
Total	\$ 350	\$ 350	\$ 0	\$ 0	\$ 114
<u>Total Federal Annual Charge</u>	\$ 9,500	\$ 12,150	\$ 5,800	\$ 710	\$ 489

ESTIMATE OF ANNUAL CHARGES (CONT'D)

	BLACK ROCK HARBOR		BURR CREEK	UPPER JOHNSONS	LOWER JOHNSONS
	Inner	Outer	<u>ANCHORAGE</u>	<u>RIVER ANCHORAGE</u>	<u>RIVER ANCHORAGE</u>
	<u>Breakwater</u>	<u>Breakwater</u>			
<u>Non-Federal Annual Carrying</u>					
<u>Charge</u>					
Interest	\$ 6,350	\$ 8,200	\$ 4,000	\$ 360	\$ 125
Amortization	2,600	3,400	1,600	150	50
Maintenance	200	200	200	200	200
Total	\$ <u>9,150</u>	\$ <u>11,800</u>	\$ <u>5,800</u>	\$ <u>710</u>	\$ <u>375</u>
 TOTAL ANNUAL CHARGE	 \$ 18,650	 \$ 23,950	 \$ 11,600	 \$ 1,420	 \$ 864



## ESTIMATE OF BENEFITS

74. Main Channel. - The deep draft commerce of Bridgeport Harbor has been studied to evaluate the benefits accruing from deepening the main channel to 34, 35, 37, and 40 feet. Benefits accruing from deepening the main channel will result from the reduction or elimination of tidal delays to present and prospective deep draft commerce, and from the reduction in transportation costs consequent upon the provision of a channel which makes possible the use of ships of deeper draft. It is not considered that benefits would accrue from disposal of dredged material on Stratford Meadows as the area has been filled by the State Highway Department.

75. Studies have been made of the various factors affecting ship navigation, such as tidal fluctuations in Bridgeport Harbor and of channel depths required for ship draft, sinkage or squat underway, uneven loading, clearance for maneuverability, lower than average tides, and lack of full project depth pending channel maintenance at infrequent intervals. Shipping interests have been consulted concerning ship operating practice. Under all circumstances it is considered necessary to allow a minimum of five feet of navigation depth in excess of registered ship draft, to allow for the various factors affecting ship navigation. Thus, for example, a 35-foot channel is considered adequate for the safe navigation of a ship of 30-foot draft without tidal delay. When, however, a ship must operate within a limited period on the higher stages of tide, with consequent calculated risk, it is considered that an additional time safety factor must be provided. This further limitation is considered necessary to insure the availability of the required minimum 5-foot clearance at all times during the navigation of the channel, with due allowance for a safe margin of time if an accident occurs. This time safety zone would vary from 0.5 hour to one hour or more, depending on the port. In Bridgeport, this insurance time allowance is one hour, in addition to the half-hour required to transit the channel. Thus, with a tidal range of 6.8 feet, as at Bridgeport, the present channel depth of 30 feet, providing a depth of 36.8 feet at slack high tide, permits the reasonably safe navigation of ships up to 30-foot draft if they take full advantage of the tide, for a minimum period at high water. Conversely, any ship in excess of 25-foot draft will experience some tidal delay on the present 30-foot channel.

76. The shipping that would be benefited by further deepening of the main channel in Bridgeport, consists of lumber carried in 28-foot draft lumber vessels to the Cilco Terminal of the City Lumber Company; coal carried in 29-foot draft colliers to the Steel Point power plant of the United Illuminating Company; and petroleum products now carried in 30-foot draft tankers of the T-2 type to the Buckley Brothers storage terminal.

77. Lumber Commerce. - From 1949 through 1954, lumber commerce in Bridgeport Harbor averaged about 40,000 tons annually, varying from a minimum of about 14,000 tons in 1952 to a maximum of almost 70,000 tons in 1950. In 1954, the latest year of which complete statistics are available, the total lumber commerce was 57,700 tons. Of this annual commerce, about 50%, or approximately 25,000 tons per year is carried in about eight vessel trips by lumber carriers with a cargo capacity of 10,000 to 12,000 tons and a registered fully loaded draft of 28 feet, which discharge only a partial cargo of 2,000 to 5,000 tons in Bridgeport.

78. It is estimated that the number of deep-draft lumber vessel trips to Bridgeport will increase from an average of eight trips per year to an annual average of ten trips over the life of the project. The average tidal delay for 28-foot draft lumber carriers on the present 30-foot channel is estimated to be 2.1 hours. The 10 trips per year, at an hourly operating cost of \$120, therefore, incur a total delay expense of \$2,500 annually. Any of the improved channels considered in this report would entirely eliminate this delay expense of lumber commerce, thus yielding an annual benefit of \$2,500 to existing and prospective lumber commerce.

79. Coal Commerce. - From 1950 through 1954 the total coal commerce in Bridgeport Harbor averaged about 250,000 tons. In 1953, the latest year for which detailed statistics are available, about 200,000 tons of coal was brought from Virginia to the United Illuminating Company's power plant at Steel Point in 17 trips by colliers with a cargo capacity of 11,800 tons and a registered draft of 29 feet. Coal receipts at Steel Point represent a part of the total present fuel requirement of the United Illuminating Company's present power plant, which is estimated to be approximately 330,000 tons of coal or fuel equivalent annually.

80. The United Illuminating Power Company, however, is constructing a new power plant on the west side of the main harbor, which will have an ultimate total capacity of about 750,000 kilowatts. Part of the development will be the construction of a wharf and the dredging of a berth and turning basin to a depth of 35 feet to permit the delivery of fuel by deep-draft vessels. Studies have been made of the company's present and future load growth. Based on a five percent load growth, it is estimated that by 1980 the ultimate development will be complete. Using an annual fuel load factor of 55 percent over the life of the navigation improvement project, it is estimated that the power development will generate an average of 2,000,000,000 kilowatt-hours annually. The annual coal requirements for power generation at the present and new plants, based on present rates of coal consumption at the existing plant and anticipated coal consumption at the new plant, will be about 960,000 tons of coal over the life of the project.

81. This volume of coal would require an average of 83 trips annually by 11,800 ton colliers with 29-foot draft. At an hourly operating cost of \$120, and an estimated average tidal delay of 2.9 hours, the total delay

expense is equal to  $\$120 \times 2.9 \times 83$ , or  $\$28,900$ . Deepening the main channel to  $3\frac{1}{4}$  feet or any greater depth would entirely eliminate such delay expense to coal commerce. The elimination of this navigation expense is therefore, considered to be a benefit accruing from any of the plans of improvement for the main channel considered, in this report, providing the new power plant uses coal as a fuel.

82. Petroleum Commerce. - Between 1947 and 1950 the total petroleum commerce of Bridgeport Harbor more than doubled, and in the five year period from 1950 through 1954 inclusive, total petroleum commerce in the harbor averaged approximately 1,800,000 tons annually. Of this total commerce, approximately 1,400,000 tons are receipts, of which about 600,000 tons annually are brought into the harbor in 36 vessel trips by T-2 tankers with a cargo capacity of 16,500 to 19,000 tons and a registered draft of 30 feet. Studies of petroleum consumption in this area indicate that a 2 percent annual increase in annual consumption is a conservative estimate upon which to base estimates of future commerce. An average 50 percent increase in the total petroleum commerce of Bridgeport Harbor and at least 50 percent increase in the proportion brought in by deep draft tankers may therefore be expected over the life of the project. The volume of petroleum products shipped to Bridgeport Harbor in deep-draft tankers for local distribution over the life of the project is therefore estimated to be at least 900,000 tons annually. This volume of petroleum commerce would require 55 vessel trips annually by 16,500-ton T-2 tankers.

83. With the present channel depth of 30 feet, the tidal delay for T-2 tankers with 30-foot draft is estimated at 3.8 hours. At an hourly operating cost of  $\$175$ , the total delay expense to navigation incurred in 55 trips would therefore be  $\$175 \times 3.8 \times 55$ , or  $\$36,600$ . This delay would be reduced to 0.9 hours per vessel trip if the channel were deepened to  $3\frac{1}{4}$  feet, leaving a delay expense of  $\$175 \times 0.9 \times 55$ , or  $\$8,700$ . The difference in expense of navigation,  $\$27,900$  is considered to be the annual benefit to petroleum commerce if carried in T-2 tankers for a  $3\frac{1}{4}$ - foot channel. A channel of 35 feet or greater depth would eliminate all delay expense to existing and prospective petroleum if carried in T-2 tankers, providing an estimated benefit of  $\$36,600$ .

84. The possibility that the United Illuminating Company's new and existing power plants might use oil rather than coal as a fuel has been considered. If Bunker C oil instead of coal were used as fuel for the new and existing power plants, the requirement is estimated to be an annual average of about 720,000 tons over the life of the project, which would be an increase over their present oil consumption. The plans for the new power plant provide storage area adaptable for either coal or oil. The existing power plant would store oil in 20,000 barrel amounts, drawn from either the power plants new storage terminal on the west side of the harbor, or from the Buckley deep-draft terminal on the

east side of the harbor. The total deep-draft petroleum receipts in Bridgeport Harbor, in this event, would be 900,000 plus 720,000 tons, or 1,620,000 tons annually, requiring an average of 99 T-2 tanker trips annually.

85. On the present 30-foot channel, the delay expense for these trips is estimated to be  $\$175 \times 3.8 \times 99$ , or  $\$65,800$ . On a 34-foot channel, the delay expense is estimated to be  $\$175 \times 0.9 \times 99$ , or  $\$15,600$ . The reduction in delay expense to navigation of  $\$50,000$  is considered to be a benefit accruing from a 4-foot deepening of the present channel. A 35-foot channel depth would entirely eliminate delay, thus providing a benefit estimated at  $\$65,800$ .

86. It is to be noted, of course, that in the event that oil were used by the power plant, there would be no deep-draft coal commerce in Bridgeport, and hence, no benefit from the elimination of tidal delay thereto.

87. Annual tidal delay expense incurred by present and prospective deep-draft lumber, coal, and oil commerce in Bridgeport Harbor on the present 30-foot channel, and on the 34 and 35-foot channels for which benefits have been evaluated, are tabulated below, both for the situation in which the new power plant uses oil and that in which it uses coal. Inasmuch as no additional reduction in tidal delay expense to ships of size and draft now in use in Bridgeport Harbor is effected by either a 37 or 40-foot channel, no specific benefit has been indicated for those depths.

Annual Tidal Delay Expense  
Bridgeport Harbor, Connecticut

Improved Channel																				
Vessel Type	Draft	Hourly Oper. Cost	XXX			30'			XXX			34'			35'			37'		
			Number of Trips	Avg. Delay	Expense	Number of Trips	Avg. Delay	Expense	Number of Trips	Avg. Delay	Expense	Number of Trips	Avg. Delay	Expense	Number of Trips	Avg. Delay	Expense			
If United Illuminating Company uses oil during the 50-year life of the channel improvement																				
T-2s	30'	\$175	99	3.8	\$ 65,800	99	0.9	\$ 15,600	0	-	0	-	0	-	0	-	0	-		
Colliers	29'	\$120	0	2.9	-	0	0	-	0	-	0	-	0	-	0	-	0	-		
Lumber Carriers	28'	\$120	10	2.1	\$ 2,500	10	0	-	0	-	0	-	0	-	0	-	0	-		
					<u>\$ 68,300</u>						<u>\$ 15,600</u>			<u>0</u>			<u>0</u>			

If the United Illuminating Company uses coal during the 50-year life of the channel improvement														
T-2s	30'	\$175	55	3.8	\$ 36,600		55	0.9	\$ 8,700		0	-	0	-
Colliers	29'	\$120	83	2.9	\$ 28,900		83	0	-		0	-	0	-
Lumber Carriers	28'	\$120	10	2.1	\$ 2,500		10	0	-		0	-	0	-
					<hr/>				<hr/>		<hr/>		<hr/>	
					\$ 68,000				\$ 8,700		0		0	

88. Supertankers. - In addition to benefits accruing from the reduction or elimination of tidal delay expense to navigation, further benefits would accrue from a reduction in the transportation costs of petroleum products if the main channel in Bridgeport Harbor were deepened sufficiently to allow supertankers to replace some portion of the T-2 tankers in which petroleum products are at present being received. Local interests based their desired improvement of the channel in part on the need for a depth which would permit tankers of greater draft to enter the harbor.

89. There is substantial evidence available that such ships will be used in Bridgeport Harbor if channel depths permit. Studies have indicated that as much as 40 percent of the tanker fleet using United States ports will soon consist of tankers of from 32 to 36-foot draft. Such vessels will be used largely for foreign petroleum commerce. Vessel trip statistics for 1953, the latest year from which complete statistics are available, indicate that over 190,000 tons or almost one-third of the deep-draft petroleum receipts in Bridgeport Harbor were carried in 13 vessel trips originating in foreign ports. In addition, the Cities Service Oil Company, for which the Buckley Brothers terminal in Bridgeport Harbor is a distribution point, has stated that it is constructing three supertankers and that they will be used to transport refined petroleum products from Lake Charles, Louisiana, to the east coast storage terminals which have channels deep enough to receive them. Vessel statistics in 1953 indicate that over 330,000 tons or over 50 percent of deep-draft petroleum receipts in Bridgeport Harbor were received in 20 vessel trips originating in Louisiana. The first two of the three supertankers being constructed by Cities Service Oil Company are now under construction and will be completed in 1956. They will have a cargo capacity of 32,000 tons, a summer draft of 33 feet 11 1/2 inches, and a normal sea speed of 16.5 knots.

90. Since Bridgeport Harbor has a mean tide range of 6.8 feet, supertankers of the kind being constructed by Cities Service could enter the harbor on the tide, with a 5-foot clearance plus a minimum time safety factor, if the channel depth were 34 feet. Any less depth is considered to completely prohibit their safe navigation in the harbor. Benefits from any greater depths would be confined to reductions in tidal delay and the provision of a greater margin for navigation safety. Reduction in transportation cost for petroleum products shipped to Bridgeport from Lake Charles, Louisiana by supertankers in lieu of T-2 tankers is estimated at \$1.30 per ton. In 1954, the Cities Service gasoline, kerosene, and fuel oil delivered to the Bridgeport terminal averaged 6.9 barrels per ton. The use of supertankers would thus reduce the transportation cost of these fuels by an average of \$0.19 per barrel. Such reduction in transportation costs is considered a benefit accruing from the improvement of the main channel to provide depths sufficient to permit the use of such vessels.

91. The benefit accruing from the replacement of two T-2 tankers of 16,500-ton capacity by one supertanker are equivalent to the capacity of the supertanker, 32,000 tons in the case of the Cities Service tankers

described, multiplied by the reduction in cost per ton, estimated at \$1.30 for petroleum products transported from Lake Charles, Louisiana to Bridgeport, or \$41,600. It is estimated that if channel depths permitted the use of these supertankers in Bridgeport, at least 4 supertanker trips annually over the life of the project could be expected. This number of trips, carrying 128,000 tons, represents slightly more than one-third of the 330,000 tons of petroleum commerce originating in Louisiana in 1953, and represents only 8 to 14 percent of the average annual deep-draft petroleum traffic expected over the life of the project. The replacement of 8 T-2 tanker trips by 4 supertanker trips provides a total reduction in transportation costs of \$166,000. This reduction in transportation costs is considered a benefit accruing from the improvement of the main channel to provide a depth of 34 feet, the minimum depth at which such vessels could enter Bridgeport, or from improvement to provide depths of 35 or 37 feet.

92. If four supertanker trips replaced eight T-2 trips in Bridgeport over the life of the project, tidal delays would result to supertankers on channels of 34, 35, or 37-foot depths. Annual tidal delay expense incurred by present and prospective deep-draft commerce in Bridgeport Harbor on the present 30-foot channel, and on channels of 34, 35, and 37-foot depths, allowing for the replacement of eight T-2 tanker trips by four supertanker trips, are tabulated below. Delay expense is indicated both for the situation in which the new power plant uses oil and that in which it uses coal. Although a 40-foot channel depth would entirely eliminate the expense of tidal delays to navigation for supertankers, inasmuch as such delay expense is but a small fraction of the savings in transportation cost, and a small fraction of the annual cost of such further channel deepening, no tabulation has been indicated for the 40-foot channel.

Annual Tidal Delay Expense with Supertankers  
Bridgeport Harbor, Connecticut

		Existing Channel						Improved Channel					
Vessel Type	Draft	Hourly Operating Cost	XXX	30'		XXX	34'		35'		37'		
			Number of Trips	Avg. Delay	Expense	Number of Trips	Avg. Delay	Expense	Avg. Delay	Expense	Avg. Delay	Expense	
If United Illuminating Company uses oil during the 50-year life of the channel improvement													
Supertankers													
	34'	\$240	0	-	-	4	3.8	\$3,600	2.9	\$2,800	1.5	\$1,400	
T-2s	30'	\$175	99	3.8	\$65,800	91	0.9	\$14,300	0	-	0	-	
Colliers	29'	\$120	0	2.1	-	0	0	-	0	-	0	-	
Lumber Carriers													
	28'	\$120	10	1.5	2,500	10	0	-	0	-	0	-	
					<u>\$68,300</u>				<u>\$17,900</u>	<u>\$2,800</u>	<u>\$1,400</u>		

If United Illuminating Company uses coal during the 50-year life of the channel improvement												
Supertankers												
	34'	\$240	0	-	-	4	3.8	\$ 3,600	2.9	\$2,800	1.5	\$1,400
T-2s	30'	\$175	55	3.8	\$36,600	47	0.9	\$ 7,400	0	-	0	-
Colliers	29'	\$120	83	2.9	\$28,900	83	0	-	0	-	0	-
Lumber Carriers	28'	\$120	10	2.1	\$ 2,500	10	0	-	0	-	0	-
					68,000				\$11,000	\$2,800	\$1,400	



93. The sum of the benefits accruing from the plans of improvement for Bridgeport Harbor considered in this report is equivalent to the reduction in tidal delay expense to navigation, plus the saving in transportation cost resulting from the provision of a channel depth which makes possible the use of supertanker to replace T-2 tankers. The estimated benefits accruing from channels with depths of 34, 35, or 37 feet, with the new power plant of the United Illuminating Company using oil or coal, and with and without the replacement of eight T-2 tanker trips by four supertanker trips, are in the following table.

SUMMARY OF ESTIMATED BENEFITS - MAIN CHANNEL

BRIDGEPORT HARBOR, CONNECTICUT

	30'	<u>WITH SUPERTANKERS</u>			37'	30'	<u>WITHOUT SUPERTANKERS</u>			37'
		<u>34'</u>	<u>35'</u>				<u>34'</u>	<u>35'</u>		
New Power Plant Using Oil										
Estimated delay expense	\$68,300	\$ 17,900	\$ 2,800	\$ 1,400		\$68,300	\$15,600	0	0	
Estimated benefit from elimination or reduction in delay		50,400	65,500	66,900			52,700	\$68,300	\$68,300	
Estimated benefit from savings in transportation		<u>166,000</u>	<u>166,000</u>	<u>166,000</u>			<u>0</u>	<u>0</u>	<u>0</u>	
TOTAL ESTIMATED BENEFIT		\$216,400	\$231,500	\$232,900			\$52,700	\$68,300	\$68,300	
New Power Plant Using Coal										
Estimated delay expense	\$ 68,000	\$ 11,000	\$ 2,800	\$ 1,400		\$ 68,000	\$ 8,700	0	0	
Estimated benefit from elimination or reduction in delay		57,000	65,200	66,600			59,300	\$68,000	\$68,000	
Estimated benefit from savings in transportation		<u>166,000</u>	<u>166,000</u>	<u>166,000</u>			<u>0</u>	<u>0</u>	<u>0</u>	
TOTAL ESTIMATED BENEFIT	\$ 223,000	\$231,200	\$232,600			\$ 59,300	\$68,000	\$68,000		

94. Black Rock Harbor. - Benefits have been estimated for a plan of improvement in Black Rock Harbor consisting of a system of breakwaters at the harbor entrance and dredged anchorages in Burr and Cedar Creeks totaling about 28 acres with a depth of six feet. Tangible benefits accruing from such improvements for recreational craft will derive from the reduction of hazards and damages now caused by waves generated by SE through SW winds to which the harbor is exposed; from increased use of the existing fleet now based in the harbor proper; from the increased use of boats now kept in back yards and in other already overcrowded ports 4 to 12 miles from Bridgeport; and from the consequent addition of new boats to the existing fleet.

95. The fleet presently based in Black Rock Harbor consists of 420 boats, including 133 cruisers, 38 auxiliary sailboats, 35 sailboats, 88 inboards, and 126 outboards. An evaluation of this fleet based on values of comparative boats indicates a total present value of \$1,728,000, with values for individual boats ranging from \$500 for small outboard motor boats to \$72,000 for large cruisers. More than 70 percent of the present fleet consists of cruisers, sailboats, inboards, and outboards of from 15 to 50 feet in length, valued at \$3,000 each or less, the average value being about \$1,400. The average value of the remaining 28 percent of the fleet is slightly more than \$11,000 each.

96. In addition to this fleet, it is estimated that 175 additional craft are presently kept either in back yards in the vicinity of Black Rock Harbor and Burr and Cedar Creeks, or in more distant already overcrowded ports 4 to 12 miles from Bridgeport. This fleet is estimated to consist of 35 cruisers, 7 auxiliary sailboats, 22 sailboats, 36 inboards, and 75 outboards. This fleet is estimated to have a total present value of \$540,000, with values of individual craft ranging from \$500 for outboards to \$18,000 for cruisers.

97. In general, it is estimated that if both breakwater protection at the harbor entrance and anchorage areas in Burr and Cedar Creek were provided, an expansion in the size of the fleet would result in an increase of about 30 percent, or a total of about 135 craft in existence over the life of the project. It is considered that this expansion would consist predominantly of the smaller and more economical classes of craft, about 50 percent consisting of outboards with an average value of \$1,400, and about 90 percent consisting of outboards, inboards, and sailboats costing \$5,000 or less. The total new value of these additional craft is estimated to be about \$520,000.

98. It is considered that portions of the total benefits potentially accruing to the provision of both breakwaters and the Burr and Cedar Creek anchorages in Black Rock Harbor are specifically assignable to each aspect of the improvement, if both protection and anchorage areas are provided. By far, the majority of benefits accruing from increased use of, and reduction of hazards and damages to the fleet presently based in the harbor proper will undoubtedly accrue from the construction of

(only)?  
adequate breakwaters. However, were the anchorage areas alone provided, it is believed that a small percentage of such benefits would accrue to such improvement. It is also considered that the class and number of craft the transfer of which would result from the provision of a safer and more comfortable harbor in the vicinity of the established yacht clubs would differ from the classes and numbers whose transfer would result from the provision of the Burr and Cedar Creeks anchorages. Similarly, the classes and numbers of new craft whose purchase would result would differ. Benefits assignable to each system of breakwaters and to Burr and Cedar Creeks anchorages have been estimated initially for the situation in which both aspects of the improvement are provided. Consideration has been given to the estimated redistribution of certain parts of these benefits which would accrue under a situation in which either the breakwaters alone, or the anchorages alone were provided.

99. The primary tangible benefits accruing from the provision of breakwaters will derive from a system of breakwaters which will reduce 3- to 4-foot waves generated by S through SW winds which blow about 20 percent of the time during the boating season from May through September, and 6- to 10-foot waves generated by S to SE winds which occur less frequently.

100. The proposed inner system of breakwaters at Black Rock Harbor would enclose an area of about 140 acres exclusive of the improved 18-foot channel. The area so enclosed would provide 40 acres from four to six feet in depth, 25 acres six to eight feet in depth, and 15 acres in excess of eight feet. Of this total area with depths of four feet or greater, approximately 50 acres would be protected from waves from S 30°W through South, and approximately 75 acres from the SE. The breakwater system would reduce the opening to the SE to about 200 feet, providing about 95 percent protection against waves six feet or more in height generated by SE winds.

101. Construction of breakwaters would provide a benefit to this fleet, estimated to be a part of the annual net return of the boats to their owners. The annual net return to the owners has been taken as the amount the owners would receive if they chartered their boats to others, this amount having been computed at various percentages of the investment value for various classes of boats, in accordance with available studies of boating practice. The composition of the existing fleet, the estimated total value of each type of craft, the percentage value taken as a reasonable annual return on a for-hire basis, and the annual net return by type are tabulated below.

<u>Type of Craft</u>	<u>Length</u> (feet)	<u>Number</u> <u>of vessels</u>	<u>Total</u> <u>Present</u> <u>Value</u>	<u>Percentage</u> <u>return</u>	<u>Annual net</u> <u>return</u>
Cruisers	20-65	133	\$1,057,000	9	\$ 95,100
Auxiliary					
Sailboats	20-65	38	373,000	9	33,600
Sailboats	15-50	35	102,000	12	12,200
Inboards	10-30	88	116,000	10	11,600
Outboards	10-30	<u>126</u>	<u>80,000</u>	10	<u>8,000</u>
		420	\$1,728,000		\$160,500

102. The total benefit which can accrue to the existing home fleet is \$160,500. However, as present conditions in the harbor, in advance of a storm, necessitates the moving of boats to more sheltered areas, hauling boats ashore and placing additional mooring lines to secure the vessels, boat owners cannot use their craft to the fullest extent due to lost time in moving boats and returning them after the storm and placing and removing additional mooring lines. Furthermore, due to the exposed nature of the harbor, it is necessary for boat owners to moor their craft well into the harbor for the greatest protection available under present conditions. This results in the vessels being moored close together and access to them more difficult. Construction of breakwaters would provide a larger protected area and allow these boats to spread out and relieve the congested condition. The owners therefore now realize about 95 percent of the total possible benefit. The improvement would allow boat owners to realize the full benefit obtainable from their craft. The net benefit to the existing fleet to be derived from the provision of the inner system of breakwaters is five percent of the total benefit or \$8,000.

103. In addition to this benefit to the existing fleet, the provision of a safe anchorage in Black Rock Harbor will induce the purchase of additional boats, the estimated for-hire return on which is considered to be a benefit. The estimated number of new boats which would be purchased as a result of the availability of a safe anchorage, together with the estimated annual return on these boats on a for-hire basis, is as follows:

<u>Type of Craft</u>	<u>Length</u> (feet)	<u>Number</u> <u>of vessels</u>	<u>Total</u> <u>Depreciated</u> <u>Value</u>	<u>Percentage</u> <u>return</u>	<u>Annual net</u> <u>return</u>
Cruisers	30-40	3	\$ 27,000	9	\$ 2,400
Auxiliary					
Sailboats	30-40	2	18,000	9	1,600
Sailboats	15-40	20	50,000	12	6,000
Inboards	10-30	5	10,000	10	1,000
Outboards	10-30	<u>30</u>	<u>23,000</u>	10	<u>2,300</u>
		60	\$128,000		\$13,300

104. Inasmuch as these boats would realize the entire benefits possible from such craft, the benefit to such boats accruing from the proposed inner system of breakwaters is considered to be equivalent to the entire annual return, or \$13,300.

105. It is considered that the construction of the proposed inner system of breakwaters will also induce the transfer of a portion of the 175 craft now based in other already overcrowded ports, pulled up in back yards, or otherwise inconveniently stored. It is estimated that about 50 of these craft, predominantly of the larger classes, would be transferred to Black Rock Harbor if the inner system of breakwaters were provided. The estimated number of these craft of each class which would be transferred as a result of the availability of a safe anchorage, together with the estimated annual return on these boats on a for-hire basis, is as follows:

<u>Type of Craft</u>	<u>Length</u> (feet)	<u>Number</u> <u>of vessels</u>	<u>Total</u> <u>Present</u> <u>Value</u>	<u>Percentage</u> <u>return</u>	<u>Annual net</u> <u>return</u>
Cruisers	30-40	15	\$135,000	9	\$12,200
Auxiliary					
Sailboats	30-40	2	18,000	9	1,600
Sailboats	15-40	7	23,000	12	2,800
Inboards	10-30	6	10,000	10	1,000
Outboards	10-30	<u>20</u>	<u>14,000</u>	10	<u>1,400</u>
		50	\$200,000		\$19,000

106. It is estimated that the owners of craft to be transferred from other ports and back yards presently enjoy only 90 percent of the possible recreational benefit. This is based on the condition that at the present time with craft based in other ports at a distance of 4 to 12 miles or in their back yards, owners necessarily incur increased travel cost and time to get to their boats or to move boats from their homes to the waterway. This additional time undoubtedly prevents the owners from taking advantage of opportunities to make numerous cruises of short period of time. The transfer of such craft to Black Rock Harbor will result in the owners enjoying full benefit of their boats. The benefits to these boats transferred from other anchorages which would accrue from the provision of the proposed inner breakwaters is ten percent of the annual net return of \$19,000, or \$1,900.

107. In addition to the benefits accruing from increased use of the present fleet, from the induced purchase of new craft, and from the induced transfer of local craft now in other anchorages and pulled up in back yards, a benefit will accrue by virtue of the reduction in storm consequent upon the provision of adequate protection.

Storms cause a yearly damage to boats moored in Black Rock Harbor that has been estimated to be \$20,000. It is estimated that this damage will be reduced by \$5,000 annually by the provision of the inner system of breakwaters, and this sum is considered a benefit accruing from such protection.

108. The total evaluated benefits assignable to the construction of the inner system of breakwaters at the entrance to Black Rock Harbor, providing anchorages in Burr and Cedar Creeks are also provided, is estimated to be as follows:

Benefit to existing fleet from increased use....	\$ 8,000
Benefit from additional new boats.....	13,300
Benefit to boats transferred.....	1,900
Benefit from reduction in storm damages.....	<u>5,000</u>

\$28,200

109. The proposed outer system of breakwaters at Black Rock Harbor would enclose an area of about 170 acres exclusive of the 18-foot channel. The area enclosed provides 43 acres with depths of four to six feet, 33 acres with depths of six to eight feet, and 25 acres with depths in excess of eight feet. Of the total area with depths of four feet or greater, about 80 acres would be protected from the S, and about 100 acres would be protected from S 30° W. By reducing the opening to S 30° W to 80 feet, this system would provide maximum protection from this direction, from which winds blow about 17 percent of the boating season with an average velocity of about 13 miles per hour. This system would reduce the opening to the SE, however, only to about 450 feet, thus providing about 85 percent protection against waves of six feet or more generated by SE winds, or somewhat less than the inner system of breakwaters. The total area protected by the outer system and the acreage protected from each direction is greater, therefore, than for the inner system, as is the degree of protection against SW winds. The degree of protection against SE winds which generate dangerously high waves is lower, however, than that provided by the proposed inner system. In summary, the outer system would appear to provide a somewhat more spacious and comfortable harbor over a greater percentage of the boating season, but somewhat less protection against hazardous storm waves.

110. In general, it is not believed that the benefits accruing from the outer system of breakwaters greatly exceed those accruing from the inner system. Inasmuch as the area protected by the inner system provides adequate protected anchorage in effective depths for the existing fleet, it is considered that no additional benefits in the form of further increased use of the existing fleet will accrue from the outer system. The benefits accruing from the outer system by virtue of increased use of the existing fleet, therefore, may be taken to be \$8,000, as for the inner system. Since the outer system provides

a somewhat greater area and a somewhat more comfortable harbor, it is estimated that it might induce a slightly greater expansion of the existing fleet over the life of the project. This expansion is estimated to be ten percent of the expansion estimated as accruing to the inner system of breakwaters, or an additional benefit of \$1,300.

111. In addition, it is considered that about ten larger craft would be transferred to Black Rock Harbor from other less convenient anchorages exclusively as a result of the construction of the outer system. These craft are estimated to consist of two cruisers at an average value of \$9,000; one auxiliary sailboat valued at \$9,000; three sailboats at an average of \$2,000; and four inboard motor boats at an average value of \$2,000, for a total value of \$41,000. The annual net return to these boats on a charter basis is estimated to be \$4,000. The annual benefit accruing to the owners is estimated to be ten percent of the annual net return, or \$400.

112. Since the majority of the yearly storm damage to boats moored in Black Rock Harbor results from SE winds, against which the outer system of breakwaters is somewhat less effective, it is estimated that the reduction of storm damages provided by the outer system would be about ten percent less than that provided by the inner system. The benefit accruing to the outer system to be derived from the reduction of storm damages is therefore estimated to be \$4,500 annually.

113. The total evaluated benefits assignable to the construction of the outer system of breakwaters at the entrance to Black Rock Harbor, providing the proposed anchorages in Burr and Cedar Creeks are also dredged, is estimated to be as follows:

Benefit to existing fleet from increased use.....	\$ 8,000
Benefit from additional new boats.....	14,600
Benefit to boats transferred.....	2,300
Benefit from reduction in storm damage.....	<u>4,500</u>

\$29,400

114. Tangible benefits accruing to the provision of 6-foot anchorage areas totaling about 28 acres in Burr and Cedar Creeks, provided breakwater protection is constructed for the harbor entrance, are considered to be derived from the provision of adequate mooring space for craft now stored in back yards and less convenient areas, and from the fleet expansion induced by the improvement over the life of the project. The city-owned nature of the Burr and Cedar Creek shore and its long range association with the development of a public park are believed to provide an inducement to the transfer of craft at present inconveniently located that would not be transferred as a result of the protection of the harbor alone. Further, the proximity of Burr and Cedar Creeks for some boat owners would probably induce them to use it in preference to



the Black Rock anchorage even were that anchorage well protected, and fully provided with adequate public landings. Similarly, considerations of the nature of the development and its location would also induce the purchase of additional craft, predominantly of the smaller and more economical classes, beyond the purchases induced by the breakwaters alone.

115. Local mooring habits and the existing proportion of each type of boat in the local fleet have been used to determine the number of each type of boat which would use the proposed Burr and Cedar Creek anchorages. The composition of the fleet which would be transferred to these anchorages, the estimated total value by class of craft, the percentage of return assumed as reasonable, and the net annual estimated return are tabulated below.

<u>Type of Craft</u>	<u>Length (feet)</u>	<u>Number of vessels</u>	<u>Total Present Value</u>	<u>Percentage return</u>	<u>Annual net return</u>
Cruisers	30-40	25	\$225,000	9	\$20,200
Auxiliary					
Sailboats	-	0	0	9	0
Sailboats	15-40	15	39,000	12	4,700
Inboards	10-30	30	40,000	10	4,000
Outboards	10-30	<u>55</u>	<u>36,000</u>	10	<u>3,600</u>
		125	\$340,000		\$32,500

116. The benefits to these boats transferred from back yards and overcrowded anchorages which would accrue from the provision of the proposed improvement of Burr and Cedar Creeks based on similar conditions described in paragraph 106, is estimated to be equivalent to ten percent of the annual net return of \$32,500, or \$3,300.

117. In addition to this benefit accruing to boats transferred from other locations, the provision of adequate anchorage area in Burr and Cedar Creeks will induce the purchase of additional boats, predominantly of the smaller and more economical classes, the estimated for-hire return on which is considered to be a benefit. The estimated number of new boats which would be purchased as a result of the availability of this anchorage area, together with the estimated annual return on these boats, is as follows:

<u>Type of Craft</u>	<u>Length (feet)</u>	<u>Number of vessels</u>	<u>Total Depreciated Value</u>	<u>Percentage return</u>	<u>Annual net return</u>
Cruisers	30-40	5	\$ 45,000	9	\$ 4,000
Auxiliary Sailboats	-	0	0	9	0
Sailboats	15-40	15	28,000	12	3,400
Inboards	10-30	20	35,000	10	3,500
Outboards	10-30	<u>35</u>	<u>23,000</u>	10	<u>2,300</u>
		75	\$131,000		\$13,200

118. Inasmuch as these boats would realize the entire benefits possible from such craft, the benefit to such boats accruing from the proposed 6- and 8-foot anchorages in Burr and Cedar Creeks is considered to be equivalent to the entire annual net return, or \$13,200.

119. The total evaluated benefits assignable to the dredging of the proposed 6-foot anchorage area in Burr and Cedar Creeks, providing breakwaters are also constructed at the entrance to Black Rock Harbor, is estimated to be as follows:

Benefit to boats transferred.....	\$ 3,300
Benefit from additional new boats.....	<u>13,200</u>

\$16,500

120. Consideration has been given to the possible benefits accruing from the provision of breakwaters at the entrance to Black Rock Harbor without the provision of anchorage areas in Burr and Cedar Creeks. Were the breakwaters alone provided, it is considered likely that some of the fleet expansion and transfer from less convenient locations attributed as benefits accruing from the provision of anchorage areas would occur though with somewhat less resulting convenience and use to the owners. A reasonable estimate of the benefits so accruing is considered to be ten percent of the benefits assigned to the Burr and Cedar Creek anchorages. Thus, it is estimated that if either system of breakwaters were constructed without the anchorage areas in Burr and Cedar Creeks, the benefits accruing to them would be increased by ten percent of \$16,500, or \$1,600.

121. In this situation, therefore, if only the inner system of breakwaters were constructed, the total evaluated benefits therefor would be \$28,200 plus \$1,600, or a total of \$29,800. If only the outer system of breakwaters were constructed, the total evaluated benefits therefor would be \$29,400 plus \$1,600, or \$31,000.

122. If the proposed Burr and Cedar Creek anchorages alone were provided with no breakwaters at the harbor entrance, it is considered unlikely that any portion of the fleet transfer or expansion attributed to the breakwaters would occur. However, it is estimated that inasmuch as these anchorages would offer safety not provided by the unprotected lower harbor, some transfer of the existing fleet would occur and that therefore some of the increased use to the existing fleet would accrue to the anchorages alone. This portion is estimated to be equivalent to ten percent of the benefit derived from increased use of the existing fleet provided by the breakwaters, or approximately \$800. Further, if breakwater protection were not provided for the harbor, the provision of anchorages in the relatively protected Burr and Cedar Creek areas would offer a haven in storms for a part of the existing fleet now in Black Rock Harbor, thus affording some reduction in annual storm damages. This is estimated to be 20 percent of the reduction afforded by the inner breakwaters, or \$1,000.

123. Thus, if the proposed Burr and Cedar Creek anchorages alone were provided, the total evaluated benefits are estimated to be \$16,500, plus \$800 for increased use of the existing fleet, plus \$1,000 for reduction of damages, for a total evaluated benefit of \$18,300.

124. No benefit has been computed as accruing to the improvement of the harbor by virtue of its increased use by transient craft. The harbor is presently used by several hundred transient craft annually, and it is believed that this number would increase substantially by virtue of its improvement. Conversely, however, the increased use of the existing fleet would undoubtedly result in a substantially larger number of boat days spent by local boats in other harbors. It is considered that the number of boat days spent in Black Rock Harbor by transient boats would be roughly equivalent to the number of boat days spent by local boats in other harbors. No reduction in benefits has been estimated for the time local boats are expected to spend in other harbors.

125. In addition to the evaluated annual benefits indicated above, certain intangible benefits will accrue from the provision of breakwater protection and adequate mooring areas in Black Rock Harbor and Burr and Cedar Creeks. The principal such intangible benefit from the provision of breakwaters derives from the provision of an adequate and well protected harbor of refuge in an area in which recreational boating has a history of continuously increasing popularity, and which is considered to have inadequate refuges to meet existing needs. In view of the limited areas of the proposed anchorages in Burr and Cedar Creeks, and their relative distance from the open water, the provision of the proposed anchorages alone is not considered to provide benefits as a refuge.

126. The provision of public landings and adequate anchorages in Burr and Cedar Creeks, together with the proposed City long range plans to develop a public park on the present site of the city dump and on

city land north of Burr Creek, would provide a highly desirable recreational feature of considerable general benefit in which recreational boating facilities would be economically available to a substantial number of people. These intangible benefits, although not readily susceptible of monetary evaluation for comparison with project costs, are nevertheless real and of genuine significance for the future development of recreational boating in this section of the Connecticut coast.

127. Upper Johnsons River Anchorage. - Improvement of the upper reach of Johnsons River to provide a 6-foot anchorage about two acres in area would result in tangible benefits accruing from increased use of the existing fleet, transferred boats from other already overcrowded ports and the consequent addition of new boats to the fleet.

128. The existing fleet consists of 62 power boats varying in length from 15 to 40 feet. Under present conditions, these boats must be moored very close together in or near the existing 9-foot channel. Although the sheltered nature of the area makes fore and aft mooring at close intervals possible with relatively little hazard, an adequate anchorage area would provide benefits by reducing the possibility of damage and by increasing the freedom and ease of mooring and traveling through the mooring area.

129. The benefit accruing to the existing fleet is considered to be a part of the annual net return of the boats to their owners. The annual net return to the owners has been taken as the amount the owners would receive if they chartered to others, this amount having been computed at various percentages of the value for various classes of boats, in accordance with available studies of boating practice. The estimated values of boats in the existing fleet were obtained from the local interests. Comparison with other available data on recreational boat values indicates that the values furnished by local interests are reasonable. The composition of the existing fleet, the estimated total value of each type of craft, the percentage value taken as a reasonable annual return on a for-hire basis, and the annual net return by type of craft are tabulated below.

<u>Type of Craft</u>	<u>Length</u> (feet)	<u>Number</u> <u>of vessels</u>	<u>Total</u> <u>Present</u> <u>Value</u>	<u>Percentage</u> <u>return</u>	<u>Annual net</u> <u>return</u>
Cruisers	20-40	26	\$68,100	9	\$6,100
Inboards	20-30	11	5,100	10	500
Outboards	15-25	25	16,900	None	0
		62	\$90,100		\$6,600

130. It is estimated that the owners of the existing fleet presently enjoy only 95 percent of the possible recreational benefits. This is based on the condition that at present boats are moored close together in or alongside the existing 9-foot channel. Access to these vessels is more difficult and vessels are exposed to possible damage in the congested channel. The benefit to be realized by the existing fleet accruing from the improvement is five percent of the total annual net return, or \$300.

131. No credit has been taken for outboards of shallow draft for justification of the 6-foot anchorage. It is probable that some of the outboards will anchor around the edges of the anchorage and in shallow water along the river's edge.

132. It is considered that the improvement will induce the transfer of at least four boats owned by local residents. These boats now based in other already overcrowded ports 4 to 12 miles from Bridgeport would consist of two 30-foot cruisers with a present-day value of \$4,000 each and two inboard motor boats valued at \$1,500 each. These transfers would be made for reasons of convenience to the local owners and improvement over access and mooring at other harbors. It is estimated that the owners of craft to be transferred from other ports presently enjoy only 90 percent of the possible recreational benefit. This is based on the condition that at the present time with craft based in other ports at a distance of 4 to 12 miles, owners necessarily incur increased travel cost and time. The additional time of travel undoubtedly prevents the owners from taking advantage of opportunities to make numerous cruises of short period of time. The transfer of such craft to Johnsons River will result in the owners enjoying the full benefit of their boats. The benefit may be evaluated as the net return which could be realized on these craft if they were operated as for-hire vessels. The estimated annual net return on these boats, assuming nine percent as a reasonable percentage return on cruisers and ten percent on outboard motor boats is \$1,000. The benefit to be realized from the transfer is ten percent of the total benefit or \$100.

133. In addition to benefits resulting from increased use of the present fleet, it is considered that improvement in the upper reaches of Johnsons River would encourage the purchase of additional craft. Local interests estimated that the fleet would double if anchorage were provided. In this event, however, the mooring area would again be as congested as at present. It is considered, therefore, that the fleet may more reasonably be expected to increase by the addition of four 30-foot cruisers valued at \$8,000 each; and three 20-foot inboard motor boats, valued at \$3,000 each; a total of seven new boats valued at \$41,000. The estimated annual return on these boats on a for-hire basis, assuming nine percent of the depreciated value as a reasonable percentage return on cruisers, and ten percent on inboards is \$1,900. Inasmuch as these boats would realize the entire benefits possible from such craft, the benefit to such boats, accruing from the proposed improvement, is considered to be equivalent to the entire annual return, or \$1,900.

134. The total evaluated benefits accruing from the improvement of upper Johnsons River is, therefore, the sum of the \$300 benefit accruing to the existing fleet, the \$100 benefit accruing to the transferred boats, and the \$1,900 benefit accruing to the induced additional fleet, or \$2,300.

135. In addition, it is considered that limited intangible benefits will accrue from the provision of a public landing and the facilitation of access of Johnsons River for purposes of recreational boating, where such access is now difficult.

136. Lower Johnsons River Anchorage. - The provision of an adequate anchorage area in lower Johnsons River, by reducing the width of the existing 15-foot channel and dredging a small area to provide a total anchorage area of about three acres with 9- and 6-foot depths, would provide benefits to the existing fleet in this area and would encourage the purchase of additional boats.

137. The present fleet consists of 133 boats, ranging in length from 15 to 48 feet. Many of these boats now are forced to moor within the limits of the 15-foot channel. The benefit to this fleet is considered to be a part of the annual net return of the boats to their owners. The annual net return to the owners has been taken as the amount the owners would receive if they chartered their boats to others, this amount having been computed at various percentages of the value for various classes of boats, in accordance with available studies of boating practice. The estimated values of boats in the existing fleet were obtained from local interests. Comparison with other available data on recreational boat values indicates that these values are reasonable.

138. The composition of the existing fleet, the estimated total value of each type of craft, the percentage value taken as a reasonable annual return on a for-hire basis, and the annual net return by type of craft are tabulated below. No benefits are indicated for the owners of out-board motor boats because they now are moored safely on the shore side of the proposed anchorage.

<u>Type of Craft</u>	<u>Length (feet)</u>	<u>Number of vessels</u>	<u>Total Present Value</u>	<u>Percentage return</u>	<u>Annual net return</u>
Cruisers	18-48	29	\$52,600	9	\$4,700
Auxiliary					
Sailboats	25-32	5	5,825	9	500
Inboards	16-18	2	1,000	10	100
Outboards	15-25	<u>97</u>	<u>14,550</u>	None	<u>0</u>
		133	\$73,975		\$5,300

139. It is estimated that the owners of the existing fleet presently realize only 95 percent of the possible recreational benefits. This is based on the condition that at present boats are moored close together in the existing 15-foot channel. The benefit to the existing fleet accruing from the new anchorage derives from the reduction in possible damages to craft moored in the channel and the reduction of congestion in the channel, thus permitting increased use of the boats. This is considered to be equivalent to five percent of the \$5,300 net annual return to boat owners indicated above, or \$300.

140. In addition to the benefits resulting from increased use of the present fleet, it is considered that improvement in lower Johnsons River would encourage the purchase of additional craft. Local interests have estimated that as many as 40 new boats would be added if the desired anchorage were provided. In that event, however, the mooring area would again be as congested as at present. It is considered, therefore, that the fleet may more reasonably be expected to increase by the addition of four new cruisers, valued at \$6,000 each, or the equivalent thereof, the total valuation of the additional craft thus being \$24,000. The estimated annual return on these boats on a for-hire basis, assuming nine percent of the depreciated value as a reasonable percentage return for cruisers, would be \$1,100. Inasmuch as these boats would realize the entire benefits possible from such craft, the benefit to such boats, accruing from the proposed improvement, is considered to be equivalent to the entire annual return, or \$1,100.

150. The total evaluated benefits accruing from the improvement of lower Johnsons River, therefore, is the sum of the \$300 benefit accruing to the existing fleet, and the \$1,100 benefit accruing to the induced additional fleet, or \$1,400.

151. In addition to these evaluated benefits, it is considered that limited intangible benefits will accrue from the provision of a public landing and the facilitation of access to Johnsons River for purposes of recreational boating, where such access is now difficult.

#### COMPARISON OF BENEFITS TO COSTS

152. Main Channel. - The following table presents a comparison of annual benefits and annual costs for the improvement of the main channel for deep draft vessels. The table shows the benefits, costs, and benefit-cost ratio for main channel depths of 34, 35, and 37 feet, both with and without the future use of supertankers and with the fuel requirements of the United Illuminating Company met by fuel oil or coal. It will be noted that very favorable benefit-cost ratios are due to the feasibility of using supertankers on channels 34 or more feet deep. It will be further noted that the incremental benefit-cost ratio accruing from the additional deepening of the channel from 34 to 35 feet is between 0.7 and 1.3, but that the incremental benefit-cost ratio accruing from deepening the channel from 35 to 37 feet is very unfavorable.

153. The relative favorability of the 34- and 35-foot channels, if supertankers are not used, depends upon the type of fuel used by the existing and new power plants of the United Illuminating Company. In the event that these plants use coal, the 34-foot depth is more favorable; if they use oil, the 35-foot depth is more favorable. It is believed that the favorable incremental benefit, the possibility that the power plants will use oil, and the intangible advantages of the 35-foot channel justify its construction in lieu of the 34-foot channel. In no circumstances considered is the construction of a channel of 37 feet or greater depth justified.

154. Recreational Improvements. - The following table presents a comparison of the estimated annual benefits and annual costs for the various plans of improvement for recreational craft which have been considered in the report. In the case of the plans for the improvement of Black Rock Harbor, it is noted that benefits attributable to the construction of breakwaters at the entrance to the harbor, and to the construction of anchorage areas in Burr and Cedar Creeks vary according to whether one or both of these improvements are provided. Benefits and costs for these improvements have therefore been indicated both separately and in those combinations which affect the benefit of each single improvement.

155. It will be noted, further, that the construction of the inner system of breakwaters alone provides a slightly more favorable ratio of benefits to costs than any other improvement or combination of improvements. However, the combined construction of the inner system of breakwaters and the dredging of the proposed Burr and Cedar Creek anchorages is believed to provide intangible benefits which, though not readily susceptible of monetary evaluation, offset the slightly smaller ratio of evaluated benefits to costs.



COMPARISON OF ANNUAL BENEFITS AND COSTS FOR MAIN CHANNEL

Bridgeport Harbor, Connecticut

	<u>With Supertankers</u>			<u>Without Supertankers</u>		
Improvement Deepen Main Channel to	34'	35'	37'	34'	35'	37'
<u>If United Illuminating Company uses oil as fuel</u>						
<u>Annual Benefit</u>						
Reduction in tidal delay	\$ 50,400	\$ 65,500	\$ 66,900	\$52,700	\$68,300	\$68,300
Reduction in transportation cost	<u>166,000</u>	<u>166,000</u>	<u>166,000</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	\$216,400	\$231,500	\$232,900	\$52,700	\$68,300	\$68,300
<u>Annual Costs</u>	\$ 54,600	\$ 66,300	\$ 87,900	\$54,600	\$66,300	\$87,900
<u>Benefit-Cost Ratio</u>	4.0	3.5	2.6	1.0	1.0	0.8

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If United Illuminating Company  
uses coal as fuel

<u>Annual Benefit</u>						
Reduction in tidal delay	\$ 57,000	\$ 65,200	\$ 66,600	\$59,300	\$68,000	\$68,000
Reduction in transportation cost	<u>166,000</u>	<u>166,000</u>	<u>166,000</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	\$223,000	\$231,200	\$232,600	\$59,300	\$68,000	\$68,000
<u>Annual Costs</u>	\$ 54,600	\$ 66,300	\$ 87,900	\$54,600	\$66,300	\$87,900
<u>Benefit-Cost Ratio</u>	4.1	3.5	2.6	1.1	1.0	0.8

Comparison of annual benefits and costs  
for Recreational Improvements

Bridgeport Harbor, Connecticut

	<u>Annual Benefits</u>	<u>Annual Costs</u>	<u>Benefit-cost Ratio</u>
Black Rock Harbor			
If inner breakwaters only are constructed	\$29,800	\$18,650	1.60
If outer breakwaters only are constructed	31,000	23,950	1.29
If Burr and Cedar Creek anchorages only are constructed	18,300	11,600	1.58
If Burr and Cedar Creek anchorages and inner breakwaters are constructed			
Burr and Cedar Creek anchorages	(\$16,500)(1)	\$11,600	(1.42)(1)
Inner breakwaters	( 28,200)(1)	18,650	(1.51)(1)
Total	<u>\$44,700</u>	<u>\$30,250</u>	<u>1.48</u>
If Burr and Cedar Creek anchorages and outer breakwaters are constructed			
Burr and Cedar Creek anchorages	(\$16,500)(1)	\$11,600	(1.42)(1)
Outer breakwaters	( 29,400)(1)	23,950	(1.23)(1)
Total	<u>\$45,900</u>	<u>\$35,550</u>	<u>1.29</u>
Upper Johnsons River Anchorage	\$ 2,300	\$ 1,420	1.62
Lower Johnsons River Anchorage	\$ 1,400	\$ 864	1.62

(1) Figures in parentheses indicate portions of benefits estimated to be attributable to the indicated segment of improvement, provided both improvements are constructed.

### PROPOSED LOCAL COOPERATION

156. The benefits to be derived from the improvement of the main channel are all general in nature; being estimated as reduction in tidal delay expense and transportation saving for commercial deep draft vessels. No local contribution of cash should be required.

157. The benefits to be derived from the construction of anchorages and breakwaters for pleasure craft are recreational benefits and are considered to be 50 percent local and 50 percent general benefits. It is considered therefore that local interests should bear a proportionate share of costs including costs of construction specifically required of local interests but exclusive of the costs of aids to navigation. Local interests would be required to make a cash contribution of 52 percent of the Black Rock Harbor breakwater cost, 66 percent of the Burr Creek anchorage and 45 percent of the Upper Johnsons River anchorage. Because the cost of construction specifically required of local interests at the Lower Johnsons River anchorage is 50 percent of the total construction cost, exclusive of aids to navigation, no cash contribution should be required for the Lower Johnsons River anchorage.

158. In addition to cash contributions toward the construction cost of the anchorages local interests should be required to furnish suitable public landings, open to all on an equal basis, in Black Rock Harbor and near the Burr Creek, Upper Johnsons River, and Lower Johnsons River anchorages. Plans for these facilities should be approved by the Chief of Engineers prior to construction.

159. Because the full use and benefit from the Burr Creek anchorage would be jeopardized by the continued existence of the present raw dump along the shoreline, local interests should be required to improve and maintain the shoreline adjacent to the anchorage to make it suitable for recreational use.

160. Local interests should also be required to agree to hold and save the United States free from damages due to construction and maintenance of the improvements, and provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the improvements and for subsequent maintenance, when and as required.

161. Officials of the City of Bridgeport have been consulted and have indicated approval of the improvements and have indicated that the City would provide the necessary cash contributions, public landings, and assurances when requested.

### ALLOCATION OF COSTS

162. Main Channel. - As the benefits from the improvement would accrue to commercial navigation, annual charges have been computed on the basis that the cost of channel improvements will be entirely borne by the United States and the berth improvements by local interests.

163. Recreational Improvements. - Local interests should bear a portion of the cost of improvements for recreational boating commensurate with the local benefits realized from the improvement. The allocation of costs between the United States and local interests is made so that the Federal and non-Federal annual carrying charges, exclusive of those for aids to navigation which are considered to be wholly a Federal responsibility, are in the same ratio as the evaluated general and local benefits.

164. The allocation of costs for the outer pair of riprap breakwaters of the Black Rock Harbor improvement is shown below:

	<u>Evaluated Benefits</u>	<u>Percent of Total</u>		<u>Annual Charges</u>
General	\$15,500	50%	Corps of Engineers	\$11,800
Local	<u>15,500</u>	<u>50%</u>	Local Interests	<u>11,800</u>
Total	\$31,000	100%		\$23,600

165. The annual carrying charge applicable to local interests includes \$200 for maintenance of the public landing and \$11,600 for interest and amortization charges. On the basis of a 50-year life for the improvement and an interest rate of 2.5 percent the interest and amortization charges represent an initial investment of \$329,000 to be allocated to local interests. Of this amount, \$5,000 is for the construction of the public landing. The remaining \$324,000 is about 52 percent of the cost of the breakwaters. Therefore, 52 percent of the breakwater cost should be allocated to local interests.

166. The allocation of costs for the inner pair of riprap breakwaters of the Black Rock Harbor improvement is shown below:

	<u>Evaluated Benefits</u>	<u>Percent of Total</u>		<u>Annual Charges</u>
General	\$14,900	50%	Corps of Engineers	\$9,150
Local	<u>14,900</u>	<u>50%</u>	Local Interests	<u>9,150</u>
Total	\$29,800	100%		\$18,300

167. The annual carrying charge applicable to local interests includes \$200 for maintenance of the public landing and \$8,950 for interest and amortization charges. On the basis of a 50-year life for the improvement and an interest rate of 2.5 percent the interest and amortization charges represent an initial investment of \$254,000 to be allocated to local interests. Of this amount, \$5,000 is for the construction of the public landing. The remaining \$249,000 is about 52 percent of the cost of the breakwaters. Therefore, 52 percent of the breakwater cost should be allocated to local interests.

168. The allocation of costs for the Burr Creek Anchorage is shown below:

	<u>Evaluated Benefits</u>	<u>Percent of Total</u>		<u>Annual Charges</u>
General	\$ 9,150	50%	Corps of Engineers	\$ 5,800
Local	<u>9,150</u>	<u>50%</u>	Local Interests	<u>5,800</u>
Total	\$18,300	100%		\$11,600

169. The annual carrying charge applicable to local interests includes \$200 for maintenance of the public landings and \$5,600 of interest and amortization charges. On the basis of a 50-year life for the improvement and an interest rate of 2.5 percent the interest and amortization charges represent an initial investment of \$160,000 to be allocated to local interests. Of the initial cost of \$160,000 assigned to local interests, \$5,000 is for the construction of a public landing. The remaining \$155,000 is approximately 66 percent of the cost of construction to be accomplished by the Corps of Engineers. Therefore, 66 percent of the first cost of the work to be done by the Corps of Engineers should be allocated to local interests.

170. The allocation of costs for the Upper Johnsons River Anchorage is shown below:

	<u>Evaluated Benefits</u>	<u>Percent of Total</u>		<u>Annual Charges</u>
General	\$1,150	50%	Corps of Engineers	\$ 710
Local	<u>1,150</u>	<u>50%</u>	Local Interests	<u>710</u>
Total	\$2,300	100%		\$1,420

171. The annual carrying charge applicable to local interests includes \$200 for maintenance of the public landing and \$510 of interest and amortization charges. On the basis of a 50-year life for the improvement and an interest rate of 2.5 percent the interest and amortization charges represent an initial investment of \$14,400 to be allocated to local interests. Of the initial cost of \$14,400 assigned to local interests, \$5,000 is for the construction of a public landing. The remaining \$9,400 is approximately 45 percent of the \$21,000 initial cost of construction to be accomplished by the Corps of Engineers. Therefore, the portion of the first cost to be allocated to local interests for the Upper Johnson River Anchorage is 45 percent. However, at the present estimated cost of \$21,000, the local contribution will be set at \$10,000 for simplicity of fund appropriations.

172. No portion of the initial cost of construction of the Lower Johnsons River Anchorage to be accomplished by the Corps of Engineers has been allocated to local interests. No cash contribution by local interests should be required because both the initial investment and annual charges for the public landing to be constructed by local interests are equal to the investment and annual charges on work to be done by the Corps of Engineers.

#### COORDINATION WITH OTHER AGENCIES

173. All Federal, State and local agencies having interest in the improvement of Bridgeport Harbor were notified of the public hearing held at Bridgeport December 15, 1949. Representatives of the City of Bridgeport, other local interests, the U. S. Fish and Wildlife Service, and the U.S. Coast Guard have all been consulted during the study concerning the proposed improvements affecting their activities. The City Officials, users of the waterways, and others have expressed approval of the proposed improvements. The U. S. Fish and Wildlife Service has stated that the improvements will have no adverse effect on fish or wildlife.

#### DISCUSSION

174. Bridgeport Harbor is located on the north shore of Long Island Sound about 37 miles east of New York City and about 20 miles west of New Haven. The main harbor includes a shallow open bay about 1 mile wide, called the outer harbor, and several inner arms or branches in the eastern part of the City of Bridgeport. Black Rock Harbor, a part of Bridgeport Harbor, is located between Fayerweather Island and the mainland about 2 miles west of the main harbor, and, with its tributaries Burr and Cedar Creeks, serves the western part of Bridgeport.

175. The history of Federal improvement of Bridgeport Harbor dates back to 1838. The existing project, authorized by the Act of March 3, 1899, and by subsequent acts, provides for a main channel 30 feet deep and generally 400 feet wide from Long Island Sound to Steel Point about 700 feet below Stratford Avenue Bridge, a turning basin of similar depth, two anchorages, a series of tributary channels of lesser depths, and breakwater protection, all for the main harbor; and an 18-foot channel through Black Rock Harbor to the head of Cedar Creek. At a public hearing in 1949, local interests expressed a desire for further deepening of the main channel to eliminate tidal delay expense to navigation experienced by deep draft vessels presently using the channel, and to provide a channel of adequate depth to allow the use of supertankers with drafts of 32 to 36 feet. They further expressed a desire for more adequate facilities to accommodate the considerable boating activity which has been steadily increasing in the Bridgeport area over the past two decades.

176. The City of Bridgeport is a logical distribution point for the highly industrialized and thickly populated area in the southwestern part of Connecticut. The commerce of the harbor has shown a continuous

increase over the last twenty years, averaging over two and a quarter million tons annually from 1950 through 1954, and exceeding two and a half million tons in 1952. Coal, coke, and petroleum products have consistently constituted a very large percentage of the commerce of the harbor, although lumber, metals and manufactures, and gravel and rock are major items of waterborne commerce. At the present time over 40 percent of the total tonnage brought into the harbor consists of lumber, coal, and oil carried in vessels drawing from 28 to 30 feet, about 30 percent of the total tonnage being petroleum products transported in vessels with a registered draft of 30 feet.

177. The most significant shift in the nature of the commerce in the past ten years has been the radical increase in the amount of petroleum products, which in recent years have accounted for over 75 percent of the total commerce of the harbor. To a substantial extent, this petroleum commerce has replaced the declining coal commerce, but the combined fuel commerce of the past five years has increased by an average of almost a quarter of a million tons annually. It is estimated that the BTU's represented by the average annual fuel commerce from 1950 through 1954 exceeded the BTU's represented by the average annual fuel commerce from 1945 through 1949 by about 65 percent. The construction in 1949 of one of the largest storage terminals in the state by Buckley Brothers, has made Bridgeport a major petroleum port.

178. Main Channel. - With respect to the improvement of the main channel, local interests have requested a channel 35 to 40 feet deep and generally 600 feet wide in lieu of the present channel 30 feet deep and 400 feet wide. The desire for a channel 600 feet wide is based on the claim that the prevailing wind is normal to the channel, tending to force vessels to the side of the channel and causing hazardous groundings. Although groundings have occurred in the channel, there is no clear evidence that these have occurred as a result of a wind which quarters the channel. The majority of deep draft vessels engaged in present or prospective commerce in the harbor have lengths ranging from 440 to 550 feet and beams ranging from 50 to 70 feet. Prospective deep draft commerce in Bridgeport Harbor does not exceed 2 to 3 vessel trips per week over the life of the project, and it is considered that prevailing navigation practice indicates that a channel width of 400 feet provides an adequate margin for safe navigation for the type and number of vessels which may reasonably be expected within the harbor.

179. Requests for a channel depth of 35 to 40 feet are based on the claim that the present and prospective deep draft commerce of the harbor incurs uneconomical tidal delay expense on the existing 30-foot channel, and that the existing channel precludes substantial savings in petroleum transportation costs which would be consequent upon a depth sufficient to allow the use of supertankers with 32 to 36-foot draft. Studies indicated early in the progress of the report that the cost of a 10-foot deepening to 40 feet would far exceed potential benefits which might accrue to such improvement. Consideration was therefore

given to three plans of improvement for the main channel, the plans differing only in that they provide channel depth of 34, 35, and 37 feet respectively. Each plan provides a channel generally 400 feet wide from deep water in Long Island Sound to Steel Point, together with a turning basin of similar depth, both channel and turning basin following the alignment of the existing channel and turning basin, and differing therefrom only in project depth.

180. There are three terminal facilities on the 30-foot main channel and turning basin which receive deep draft commerce at the present time. The Cilco Terminal Wharf, owned and operated by the City Lumber Company of Bridgeport, Inc. has depths of 30 to 31 feet alongside, and is used for the receipt of lumber. The wharf of the United Illuminating Company, with depths of 16 and 32 feet in its berth, is used for the receipt of coal and fuel oil for plant consumption. The Buckley Brothers Terminal, with depths of 32 to 33 feet alongside is used for the receipt of petroleum products and is equipped with pipe lines to storage tanks with a capacity of nearly 2,000,000 barrels. In addition, the United Illuminating Company is constructing a new power plant on the west side of the channel opposite Steel Point, which will be provided with a terminal with a depth of 35 feet alongside for the receipt of coal or petroleum for plant consumption.

181. Over the past five years, deep draft commerce in Bridgeport Harbor which would benefit by a deepening of the main channel has consisted of an average of 8 trips by 28-foot draft lumber carriers bringing 20,000 tons of lumber annually to the Cilco Terminal, where they have discharged partial cargoes of 2,000 to 5,000 tons; an average of 17 trips by 29-foot draft colliers, bringing 200,000 tons of coal to the Steel Point terminal of the United Illuminating Company annually; and an average of 36 trips annually by 30-foot draft T-2 tankers bringing 600,000 tons of petroleum products to the storage terminal of the Buckley Brothers.

182. Studies of petroleum consumption in this area indicate that a 2 percent annual increase in consumption is a conservative estimate upon which to base estimates of future commerce. A 50 percent increase in the total petroleum commerce in Bridgeport Harbor, and at least a 50 percent increase in the portion brought in by deep draft tankers may therefore be expected over the life of the project. Based on present annual averages, it is thus indicated that an annual volume of approximately 900,000 tons of petroleum products may be expected over the life of the project.

183. The new power plant being constructed by the United Illuminating Company will have an ultimate total capacity of 750,000 kilowatts. On the basis of studies of the company's present and future load growth, it is estimated that by 1980 the ultimate development will be complete. Using an annual load factor of 55 percent over the life of the navigation project, it is estimated that this power development will generate an average of 2 billion kilowatt-hours annually. The annual fuel requirements for this generation will be about 960,000 tons of coal, or 720,000 tons of oil.



184. In view of the existing deep draft commerce, the estimated increase in petroleum consumption, and the development of the new power plant, total deep draft coal and petroleum commerce over the life of the project is estimated to be 960,000 tons of coal and 900,000 tons of petroleum products annually if the new power plant burns coal, and 1,620,000 tons of petroleum products if the new power plant burns oil. In addition it is estimated that the average deep draft lumber commerce over the life of the project will consist of 25,000 tons of lumber carried in an average of 10 vessel trips by 28-foot draft lumber vessels. All benefits accruing to improvement of the main channel from the reduction or elimination of tidal delays will derive from this commerce.

185. Local interests based their desired improvement of the main harbor in part on the need for a depth which would permit tankers of greater draft to enter the harbor. It was claimed that very substantial savings in transportation costs could be effected by the substitution of supertankers with drafts of from 32 to 36 feet for presently used T-2 tankers with drafts of 30 feet and cargo capacities of 16,500 tons. Studies indicate that in fact savings effected by such replacement are very great. It is estimated that the cost of transportation from Lake Charles, Louisiana, to Bridgeport for 32,000 tons of petroleum products in one supertanker of 32,000-ton capacity would be \$1.30 less per ton than for the same tonnage carried in two T-2 tankers. Inasmuch as in 1954 the Cities Service gasoline, kerosene, and fuel oil delivered to the Bridgeport terminal from Lake Charles averaged 6.9 barrels per ton, the use of supertankers would thus reduce the transportation cost of these fuels by an average of \$0.19 per barrel.

186. In 1953, the latest year for which complete statistics are available, over 50 percent of the deep-draft petroleum commerce in Bridgeport originated in Louisiana, and approximately 30 percent more originated in foreign ports. Cities Service Oil Company, for which the Buckley Brothers terminal in Bridgeport is a distribution point, has stated that they are constructing three supertankers with drafts of 34 feet, normal sea speeds of 16.5 knots, and cargo capacities of 32,000 tons, and that the first two of these are now under construction and will be completed in 1956. The company has stated that it intends to use these vessels to transport refined petroleum products from Lake Charles, Louisiana to the east coast storage terminals which have channels deep enough to receive them. The total savings in transportation costs resulting from the replacement of two trips by T-2 tankers with 30-foot draft and 16,500 ton capacities by one supertanker with 34-foot draft and 32,000 ton capacity is estimated at \$41,600.

187. The benefits accruing from any deepening of the channel will result in part from the reduction or elimination of tidal delay expense to navigation, and in part from potential savings in transportation costs. Inasmuch as a 34-foot depth is considered to eliminate all tidal delays for colliers with 29-foot draft, the ratio of benefits accruing from reduction or elimination of tidal delay expense to cost will be greatest

for a 34-foot channel depth if the new power plant of the United Illuminating Company uses coal. As a 35-foot depth is considered necessary to eliminate tidal delay expense for T-2 tankers with 30-foot draft, the ratio of benefits accruing from the reduction or elimination of delay expense to costs will be greatest for a 35-foot channel depth if the new power plant uses oil. Since all delays are eliminated for the deepest draft ships now in use by a 35-foot channel depth, it will be apparent that the ratio of reduction of delay expense to costs will decrease sharply for the more costly 37-foot channel.

188. In all of the circumstances of present and prospective commerce considered the annual benefits resulting exclusively for the reduction or elimination of delay expense are about equal the annual charges for improvement for either a 34 or 35-foot channel. The maximum benefit cost ratio resulting exclusively from the elimination of tidal delay expense is 1.1 to 1, this being the ratio for a 34-foot channel depth if the new power plant uses coal.

189. However, in view of the firm evidence that Cities Service Oil Company has under construction 34-foot draft supertankers which it proposes to use in petroleum commerce between Lake Charles, Louisiana and east coast terminals with adequate channels, it is considered that they will enter Bridgeport Harbor if practicable. Since Bridgeport is a Cities Service distribution point, it is believed that some replacement of presently used T-2 tankers by these supertankers will occur over the life of the project, with consequent heavy savings in transportation costs constituting a substantial general benefit. The replacement of eight T-2 tanker trips by four supertanker trips, representing approximately one-third of the Bridgeport petroleum commerce carried in T-2s from Louisiana in 1953, would provide a saving in transportation costs of \$166,000.

190. It will be readily appreciated that where elimination of tidal delay expense alone produced benefits yielding benefit-cost ratios of approximately unity, the addition of benefits derived from savings in transportation costs consequent upon the use of supertankers will yield highly favorable benefit-cost ratios. The ratios of annual benefits to annual charges for the various channel depths considered, if the new power plant uses oil are \$216,400 to \$54,600, for a benefit-cost ratio of 4.0 for a 34-foot channel depth; \$231,500 to \$66,300 for a benefit-cost ratio of 3.5 for a 35-foot channel depth; and \$232,900 to \$87,900, for a benefit-cost ratio of 2.6 for 37-foot channel depth. If the new power plant uses coal, the ratios of annual benefits to annual charges are \$223,000 to \$54,600 for a benefit-cost ratio of 4.1 for a 34-foot channel depth; \$231,200 to \$66,300, for a benefit-cost ratio of 3.5 for a 35-foot channel depth; and \$232,600 to \$87,900, for a benefit-cost ratio of 2.6 for 37-foot channel depth.

191. Although the 34-foot channel depth has the highest ratio of benefits to costs on the one hand, and the 37-foot channel depth has a favorable ratio on the other hand, it will be noted that the incremental

benefit to cost ratio resulting from the additional deepening from 34 to 35 feet is favorable if the power plant uses oil and nearly favorable if coal is used, while that from 35 to 37 feet is unfavorable. In addition to this fact, a 34-foot depth represents the minimum channel upon which a 34-foot draft ship could safely enter Bridgeport Harbor where the mean range of tide is 6.8 feet. A 35-foot channel is believed to provide a highly desirable additional margin for safe navigation. In view of these facts, the 35-foot channel depth is considered the most justified of the three channel depths considered.

192. Recreational Improvements. - In addition to functioning as a commercial distribution point, Bridgeport has long been a center of recreational boating activities. Although there are some recreational boating activities in the main harbor itself, the majority of facilities and activity is located in Johnsons River and in Black Rock Harbor, the latter being the largest center of recreational boating in Bridgeport. The exposure of Black Rock Harbor to SE through SW winds has always presented some hazard to boating in the harbor. In 1926 and again in 1937 local requests for the construction of breakwaters were unfavorably considered, the limited size of the then existing fleet and the local nature of the benefits being found not to warrant Federal improvement. Since 1937, however, the Bridgeport area has enjoyed its full share of the nearly 100 percent national increase in recreational boating. With this very considerable recent growth, existing mooring areas in Johnsons River have become congested, and limitations of anchorage area and lack of protection in Black Rock Harbor have presented increasing problems to boat owners.

193. In accordance with the request of local interests, this report has considered plans for the improvement of recreational boating facilities in both Johnsons River and Black Rock Harbor. Alternative plans for breakwaters protecting the entrance to Black Rock Harbor have been considered, as well as a plan for the provision of a new anchorage area in Burr and Cedar Creeks at the head of Black Rock Harbor. In Johnsons River plans have been considered for the provision of two small anchorages.

194. Black Rock Harbor. - Black Rock Harbor, a part of Bridgeport Harbor, located about 2 miles west of the main harbor, is about one mile long and has a width reducing from about 2,500 feet at its entrance to about 250 feet at its northern end. Burr Creek is a small, shallow inlet located on the west side of Cedar Creek, about 1,000 feet above the head of Black Rock Harbor proper. Cedar Creek extends northeast from the head of the harbor for about one mile, branching into an east and west channel at its head. Three yacht clubs and the Coast Guard Auxiliary are located on the west side of the harbor itself, and three boat yards equipped for hauling out and repairing small craft are located just above the head of the harbor on Burr and Cedar Creeks.

195. The harbor offers substantial area in effective depths for the anchorage of recreational boats on either side of the improved 18-foot channel which extends from deep water outside the harbor to the head of Cedar Creek. Well protected from the east by Fayerweather Island, and to the north and west by the mainland, the harbor is exposed to the south through southeast and only partially protected from the south to southwest by Penfield Reef, located about 1.5 miles south of the mouth of the harbor. The relatively inland location of Burr and Cedar Creeks offers greater natural protection, but at present there are very limited areas with effective depths. The existing local pleasure fleet consists of 420 boats that are based in Black Rock Harbor in the vicinity of the yacht clubs. In addition, about 500 transient craft visit the harbor annually and stay an average of two days.

196. Winds from the S through SW, which blow about 20 percent of the boating season from May 1 through September, produce a considerable chop in the harbor which reduces its effectiveness as an anchorage for recreational boating. Winds from the SE, which occur less frequently, are often of higher velocity, generating waves of from six to ten feet which result in substantial annual damages to the fleet of 420 craft based in the harbor. In addition, the lack of a safe anchorage in Black Rock Harbor, and the lack of adequate mooring areas in Burr and Cedar Creeks results in about 175 locally owned craft being kept either in back yards or other inconveniently located storage places, or moored in already overcrowded ports 4 to 12 miles distant from Bridgeport.

197. In general, the present local pleasure fleet is limited in use by the fact that virtually no effective depths are adequately sheltered from prevailing winds from the SE through the SW. For the same reason, the use of the harbor as a harbor of refuge is virtually precluded. It appears that protection against seas set up by SE through SW winds, and the provision of anchorage area is highly desirable for the continued safety of the fleet, the encouragement of expansion of the local fleet, and as a means of affording a suitable and convenient home port for locally owned boats now inconveniently based or stored.

198. At a public hearing in 1949, local interests expressed a desire for breakwaters at the entrance to Black Rock Harbor and for dredged areas within the harbor. Later studies indicated that ample areas with desired natural depths existed in locations which would be protected by breakwaters, making the dredging of anchorages unnecessary at this time. Subsequent conferences with city officials indicated that long range city plans provide for the development of a public park on the present site of the city dump and on land north of Burr Creek. In conjunction with this plan, local officials expressed a desire for the development of anchorages in Burr and Cedar Creeks.

199. Plans considered for the improvement of Black Rock Harbor consist of two alternate systems of breakwaters, an "outer" and an "inner" system, at the entrance to the harbor; and the provision of

anchorage areas in Burr and Cedar Creeks with a total of about 28 acres with depths of 6 feet.

200. The nature and extent of the benefits accruing from the two aspects of improvement are considered to be different although closely interrelated. It will be readily appreciated that the construction of breakwaters will provide the maximum benefit to the existing fleet based in Black Rock Harbor in the vicinity of the yacht clubs, and the maximum reduction of hazards and damages to that fleet. Further, by providing a safe harbor in the vicinity of established recreational facilities, it will encourage the transfer of larger craft owned by residents of the area and now based in overcrowded harbors elsewhere, and will likewise encourage the purchase of additional craft. On the other hand, the provision of adequate mooring areas in the vicinity of Burr and Cedar Creeks, in conjunction with long range city plans for the development of a park in that area, will encourage the transfer and increased use of a large number of smaller craft now kept in back yards or otherwise inconveniently stored, and will encourage the purchase of a substantial number of additional craft, predominantly of the smaller and more economical type.

201. Were only one aspect of the improvement provided, however, it is believed that a small proportion of certain benefits attributable to each separate aspect if both were provided, would accrue to the single improvement. For these reasons, benefits were estimated for an improvement consisting of both breakwater protection and the proposed Burr and Cedar Creek anchorages. Subsequently, benefits were estimated for the situation in which either one aspect of the improvement alone were provided.

202. The "outer" system of breakwaters consists of an east breakwater 800 feet long and extending west from the tip of Fayerweather Island, and a west breakwater 1,050 feet long and extending S 30°E to a point 450 feet southwesterly of the east breakwater. This system of breakwaters would protect over 100 acres with depths of 4 feet or greater from waves generated by winds from the SE through SW, and although the breakwater gap would be open to high storm waves from the SE, the breakwaters would reduce six-to ten-foot waves to three to five feet before they reached the western shore inside the harbor. The estimated first cost of the breakwater system, including the \$5,000 cost of a public landing, and \$4,000 for aids to navigation is \$639,000, of which \$329,000 would be borne by local interests. The total estimated annual charges would be \$23,950, including \$11,800 to be borne by local interests, representing annual costs of the required contribution to the Federal project, and annual costs for the related public landing. The total estimated annual benefits for the outer system of breakwaters, provided Burr and Cedar Creek anchorages were also dredged, are \$29,400 for a benefit-cost ratio of 1.23.

203. The second, or "inner" system of breakwaters considered consists of a pair of breakwaters about 500 feet north of the outer system. This pair consists of an east breakwater about 900 feet long and a west

breakwater about 650 feet long. This system would protect about 80 acres with depths of 4 feet or greater from waves generated by winds from the SE through the SW, offering somewhat less satisfactory protection against S to SW winds generating two-to three-foot waves, but slightly greater protection against the high waves generated by winds from the SE. The estimated first cost of this breakwater system, including the \$5,000 cost of a public landing, and \$4,000 for aids to navigation is \$489,000, of which \$254,000 would be borne by local interests. The total estimated annual charges would be \$18,650, including \$9,150 to be borne by local interests, representing annual costs of the required contribution to the Federal project and annual costs for the related public landing. The total estimated annual benefits for the inner system of breakwaters, provided the Burr and Cedar Creek anchorages were also dredged, are \$28,200 for a benefit-cost ratio of 1.51.

204. The plan of improvement considered in Burr and Cedar Creeks consists of modifying the existing project to abandon the 7-foot channel presently provided by the existing project in Burr Creek, and dredging a 28-acre mooring area to a depth of 6 feet in Burr Creek and on each side of Cedar Creek. The estimated first cost of this anchorage, including the \$5,000 cost of a public landing, is \$240,000 of which \$160,000 would be borne by local interests. The total estimated annual charges would be \$11,600, including \$5,800 to be borne by local interests, representing annual costs of the required contribution to the Federal project and annual costs for the related public landing. The total estimated annual benefits, providing either system of breakwaters is also constructed, are \$16,500 for a benefit-cost ratio of 1.42.

205. As noted earlier, if a single aspect of the proposed improvement were completed in lieu of both breakwaters and the proposed anchorages, the nature and extent of the benefits accruing to each aspect is somewhat different. If the outer system of breakwaters only were constructed, without the provision of the dredged anchorages in Burr and Cedar Creeks, the total estimated annual benefits would be \$31,000. Against annual costs of \$23,950, this improvement provides a benefit-cost ratio of 1.29.

- 206. If the inner system of breakwaters only were constructed, without the provision of dredged anchorages in Burr and Cedar Creeks, it is estimated that the total annual benefits would be \$29,800. Against annual costs of \$18,650, this improvement provides a benefit-cost ratio of 1.60.

207. If the proposed anchorages in Burr and Cedar Creeks alone were provided with no breakwater protection at the harbor entrance, the total estimated annual benefits are \$18,300. Against annual cost of \$11,600, this improvement provides a benefit-cost ratio of 1.58.

208. Although a slightly higher benefit-cost ratio is provided by the construction of the inner system of breakwaters only, it is considered that an improvement consisting of the inner system of breakwaters together with the proposed 6-foot anchorage area in Burr and Cedar Creeks provides the most desirable combination of tangible and intangible benefits. Such an improvement has a present estimated total first cost, including \$10,000

for two public landings, of \$729,000, of which local interests would bear a total of \$414,000. The total estimated annual charges for these improvements would be \$30,250, including \$14,950 to be borne by local interests, representing annual costs of the required local contribution to the Federal project, and annual costs of the related public landings. The total estimated annual benefits from these improvements would be \$44,700, for a benefit-cost ratio of 1.48. In addition to these evaluated benefits, it is considered that the inner system of breakwaters, together with the proposed Burr and Cedar Creek anchorages would provide a highly desirable harbor of refuge in an area where it would materially increase the safety of recreational boating, and a maximum encouragement to the development of recreational boating facilities for a substantial number of people.

209. Johnsons River. - Johnsons River is a stream tributary to the main harbor in Bridgeport, entering the harbor from the northeast just north of Pleasure Beach. Well sheltered from all directions, the river is navigable for about one mile. Located on the west side of the river are two yacht clubs, a boat storage and repair yard, a small craft engine company, and an oil terminal. One oil terminal is located on the east side of the river. The existing project for Bridgeport provides for a channel in Johnsons River 15 feet deep at mean low water, generally 200 feet wide to a point about 1,700 feet below Hollisters Dam, thence nine feet deep, 100 feet wide to a point about 600 feet below the dam.

210. At the present time, there is a local fleet of 62 pleasure craft based in the upper section of the river and another fleet of 133 pleasure craft based on the lower section of the river. Two separate improvements have been requested by local interests to provide more adequate anchorage facilities for these two fleets. The first of these, the Upper Johnsons River Anchorage, involves the dredging of a 6-foot anchorage at the head of Johnsons River. The second, or Lower Johnsons River Anchorage, involves the provision of 6 and 9-foot anchorage areas.

211. Upper Johnsons River Anchorage. - The plan for this area would provide a 6-foot anchorage of about 2 acres, which would reduce mooring congestion among the local fleet of 62 boats now moored along the channel and at the head of the river and would provide space for some additional boats. The estimated first cost of the anchorage is \$26,000, including \$5,000 for a public landing. Of this total cost \$15,000 would be by local interests. The total estimated annual charges would be \$1,420, including \$710 to be borne by local interests, representing annual costs of the required contribution to the Federal project and the annual costs for a related public landing. The total estimated annual benefits are \$2,300, for a benefit-cost ratio of 1.62.

212. Lower Johnsons River Anchorage. - The plan of improvement for the lower section of Johnsons River consists of modifying the existing project by changing the channel limits on the west side of the 15-foot channel to provide a nine-foot anchorage area of about 2.4 acres and dredging to provide a six-foot anchorage area of about 0.6 acre. The existing 15-foot channel at the point of Johnsons River considered varies

in width from 225 to 350 feet. The improvement considered would reduce this width to 150 feet, which is considered adequate for the small amount of commerce now using the channel above this point. The Sun Oil Co. has approved the plan, as the channel width of 250' opposite their dock will not restrict their operations and the anchorage will permit the pleasure boats to moor outside the channel limits. The improvement would reduce congestion among the existing fleet of 133 boats, provide some space for additional boats, and provide a public landing. The estimated first cost of the improvement, including the \$5,000 cost of the public landing and \$400 for aids to navigation, is \$10,400, of which \$5,000 would be borne by local interests. The total estimated annual charges would be \$864 including \$375 to be borne by local interests for the annual costs of the related public landing. The total estimated annual benefits are \$1,400, for a benefit-cost ratio of 1.62.

### CONCLUSIONS

213. Main Channel. - Bridgeport Harbor receives a substantial annual tonnage of lumber, coal, and petroleum products in deep-draft vessels, the latter commodity constituting the bulk of deep-draft commerce. The current construction of a new power plant which will be equipped to receive deep-draft fuel shipments may be expected to bring large increases in deep-draft commerce in the harbor. There is substantial evidence that, if channel depths permitted, deeper draft tankers would be used in Bridgeport Harbor with resulting heavy savings in transportation costs.

214. Studies have indicated that deepening the main channel to 34 feet would reduce delay expense for present and prospective deep-draft commerce, and provide a minimum depth on which 32,000-ton supertankers could enter the harbor. A channel 35 feet deep would eliminate all tidal delay expense for present commerce in the harbor, would provide more adequately for prospective increases in commerce, and would provide a safer margin for navigation of deeper draft vessels, the use of which may be expected. Further deepening beyond 35 feet is not justified at this time.

215. It is the opinion of the Division Engineer that the improvement of the existing and completed 30-foot channel and turning basin to a depth of 35 feet at mean low water is justified, and that the improvement should be constructed at the expense of the United States. The benefit-cost ratio for the proposed improvement is 3.5, benefits being derived from reduction in tidal delay expense and savings in transportation costs resulting from the use of supertankers which will be made possible by the proposed improvement. The total estimated cost of constructing the improvement is \$1,700,000, exclusive of \$30,000 costs of wharf and berth improvements and \$400 costs for additional aids to navigation.

216. Local interests should make such alterations to existing deep-draft berths as are necessary, provide all areas required for the disposal



of hydraulic-dredged materials, and should relieve the United States from claims for damages that might arise from the construction of the improvement.

217. It is anticipated that construction of the commercial improvement would take two years. If the project is authorized, funds for the Corps of Engineers work should be appropriated over a period of two fiscal years to assure economical prosecution of the project.

218. Recreational Improvements. - The recreational fleets using Black Rock Harbor and sections of Johnsons River have increased in size to the extent that existing mooring areas are no longer adequate. Further, in Black Rock Harbor, the local pleasure fleet is limited in use since effective depths are inadequately sheltered from prevailing winds from the SE through the SW. Since the present recreational fleets are large and may be expected to increase, the improvement of Black Rock Harbor to provide more adequately protected anchorage area, and the improvement of Burr and Cedar Creeks and of Johnsons River to provide additional anchorage area are considered to be warranted. All of these improvements are essentially as desired by local interests.

219. Black Rock Harbor. - It is the opinion of the Division Engineer that a system of breakwaters, consisting of an east breakwater about 900 feet long and a west breakwater about 650 feet long, at the entrance to Black Rock Harbor is warranted to provide needed protected anchorage for the present and prospective recreational fleet. The benefit-cost ratio for the proposed improvement, considered exclusive of its relation to the proposed anchorages in Burr and Cedar Creeks, is 1.6. The total estimated first cost of constructing the improvement is \$480,000 exclusive of \$5,000 local cost for construction of a public landing and \$4,000 for aids to navigation.

220. A local cash contribution of 52 percent of the construction cost should be required in view of the extent of local benefits to be derived from the project. The presently estimated local cash contribution is \$249,000, exclusive of costs of construction required of local interests. In addition, local interests should provide a suitable public landing, and should relieve the United States from claims for damages that might arise from the construction of the improvement. The share of the first cost to be borne by the United States is estimated to be \$231,000, exclusive of aids to navigation estimated to cost \$4,000. If the project is authorized, funds for the entire improvement should be appropriated in one fiscal year in order to assure economical prosecution of the work.

221. Officials of the City of Bridgeport have indicated that the City would provide assurances that the requirements of local cooperation would be met.

222. Burr Creek Anchorage. - It is considered that improvement of Burr and Cedar Creeks by dredging a 28-acre mooring area 6 feet deep, in Burr Creek and on each side of Cedar Creek near Burr Creek, is also warranted. The benefit-cost ratio for the proposed improvement, considered exclusive of its relation to the proposed breakwaters at the entrance to Black Rock Harbor, is 1.6. The total estimated cost of constructing the improvement is \$235,000, exclusive of an estimated local cost of \$5,000 for construction of a public landing.

223. A local cash contribution of 66 percent of the construction cost should be required in view of the extent of local benefits to be derived from the project. The presently estimated local cash contribution is \$155,000, exclusive of costs of construction required of local interests. In addition, local interests should provide a suitable public landing, and should relieve the United States from claims from damages that might arise from the construction of the improvement. The share of the first cost to be borne by the United States is estimated at \$80,000. If the project is authorized, funds for the entire improvement should be appropriated in one fiscal year in order to assure economical prosecution of the work.

224. Officials of the City of Bridgeport have indicated that the City would provide assurances that the requirements of local cooperation would be met.

225. It is noted that the combined first costs of the proposed breakwaters at the entrance to Black Rock Harbor, and of the proposed 6-foot anchorage in Burr and Cedar Creeks, which constitute closely related improvements, total \$715,000, exclusive of local costs of \$10,000 for construction of public landings and exclusive of aids to navigation estimated to cost \$4,000. The combined projects have a benefit-cost ratio of 1.5. The total required local cash contribution, exclusive of costs of construction required of local interests is \$404,000. The total share of the first cost to be borne by the United States is estimated to be \$311,000, exclusive of aids to navigation estimated to cost \$4,000.

226. Johnsons River. - It is the opinion of the Division Engineer that two separate small anchorage areas in Johnsons River are warranted at this time to provide more adequate mooring facilities for existing recreational fleets, and for small expansions of those fleets.

227. Upper Johnsons River Anchorage. - It is concluded that improvement of Johnsons River by construction of a 6-foot anchorage of about 2 acres at the end of the 9-foot channel, between Hollisters Dam and the existing Johnsons River channel, is warranted to reduce present mooring congestion in and near the channel, and to provide space for new boats. The benefit-cost ratio of the proposed improvement is 1.6. The total estimated first cost of constructing the improvement is \$21,000, exclusive of a local cost of \$5,000 for construction of a public landing.

228. A local cash contribution of 45 percent of the construction cost, presently estimated to be \$9,400 should be required in view of the extent of local benefits to be derived from the project. For simplicity of appropriation procedures, the above required contribution is rounded out to \$10,000. In addition, local interests should be required to provide a suitable public landing, and to relieve the United States from claims from damages that might arise from the construction of the improvement. Officials of the City of Bridgeport have indicated that these requirements will be met. The share of the first cost to be borne by the United States is estimated at present cost levels to be \$11,000.

229. Lower Johnsons River Anchorage. - It is further concluded that improvement of Johnsons River near the Miamogue Yacht Club by constructing an anchorage area of approximately 3 acres with 6 and 9-foot depths, is warranted to provide anchorage for recreational craft. The benefit-cost ratio of the proposed improvement is 1.6. The total estimated first cost of the improvement is \$5,000, exclusive of a local cost of \$5,000 for construction of a public landing and exclusive of \$400 for aids to navigation.

230. Local interests should be required to construct a suitable public landing, and to relieve the United States of any claims for damages which might result from the construction of the improvement. Inasmuch as the required construction by local interests constitutes approximately 50 percent of the estimated total first cost of the project, it is the opinion of the Division Engineer that no local cash contribution should be required. Officials of the City of Bridgeport have indicated that the requirements will be met. The share of the first cost to be borne by the United States is estimated to be \$5,000, exclusive of \$400 for additional aids to navigation.

#### RECOMMENDATIONS

231. It is recommended that the existing project for Bridgeport Harbor be modified to provide for:

a. A main channel 35 feet deep at mean low water, 400 feet wide, extending from Long Island Sound to Tongue Point, widening to approximately 600 feet at the bend opposite Cilco Terminal, and narrowing to 300 feet at the lower end of the Poquonock River Channel at a point 800 feet below the Stratford Avenue Bridge; and a turning basin 35 feet deep at mean low water south and southeast of Cilco Terminal and extending approximately 500 feet east thereof. The total estimated cost of the improvement is \$1,700,000, exclusive of costs of berth improvements and \$400 for additional aids to navigation. The estimated first cost to the United States of this project is \$1,700,000 for new work, exclusive of costs of additional aids to navigation and with \$2,000 annually for maintenance in addition to that now required.

b. Two riprap breakwaters, one extending 900 feet westerly from a point near Fayerweather Island on the east side of the entrance to Black Rock Harbor, and one extending 650 feet southeasterly on the west side of the entrance; both breakwaters to have a top width of eight feet at an elevation of ten feet above mean low water, and side slopes of 1 on 1 on the harbor side, and 1 on 1.5 on the seaward side. The total estimated cost of the improvement, exclusive of costs of a public landing to be provided by local interests, and exclusive of \$4,000 for aids to navigation, is \$480,000 to be borne jointly by the United States and local interests. The total cost to the United States for new work is estimated at \$231,000, with \$2,000 annually for maintenance, exclusive of aids to navigation estimated to cost \$4,000.

c. Abandonment of the Burr Creek Channel, and the provision of a small craft anchorage in Burr and Cedar Creeks consisting of a 28-acre anchorage with a depth of 6 feet, in Burr Creek and on each side of Cedar Creek adjacent to Burr Creek. The total estimated cost of the improvement, exclusive of costs of a public landing to be provided by local interests, is \$235,000, to be borne jointly by the United States and local interests. The total cost to the United States for new work is estimated at \$80,000, with \$3,000 annually for maintenance.

d. A 2-acre anchorage area with a depth of 6 feet at the head of Johnsons River, between the existing Federal channel and Hollisters Dam. The total estimated cost of improvement, exclusive of cost of a public landing to be constructed by local interest, is \$21,000 to be borne jointly by the United States and local interests. The total cost to the United States is estimated at \$11,000, with \$300 annually for maintenance.

e. A 2.4 acre anchorage area with a depth of 9 feet and a 0.6 acre anchorage with a depth of 6 feet in Johnsons River, these areas to be provided partially by dredging and partially by reducing the width of the existing Federal channel opposite and north of the present Miamogue Yacht Club. The total estimated cost of the improvement, exclusive of the cost of a public landing to be provided by local interests, is \$5,000 to be borne entirely by the United States. The total cost to the United States is estimated at \$5,000 with \$200 annually for maintenance, exclusive of aids to navigation estimated to cost \$400.

232. All modifications are recommended generally as shown on plates 1, 2, and 3. The total estimated cost of the new work for the above modifications is \$2,441,000, exclusive of local costs of berth improvements and public landing to be provided by local interests at a total estimated cost of \$50,000, and exclusive of aids to navigation, estimated to cost \$4,800. The total estimated cost to the United States is \$2,027,000 with \$9,500 annually for additional maintenance.

233. The above modifications of the existing project are recommended subject to the following conditions.

a. Main Channel; That local interests make all necessary berth alterations, and provide suitable disposal areas for materials hydraulically dredged from the inner channel and turning basin.

b. Black Rock Harbor breakwaters; That local interests contribute 52 percent of the cost of the improvement, the local cash contribution now being estimated at \$249,000; and provide a suitable public landing for recreational craft.

c. Burr and Cedar Creek Anchorage; That local interests contribute 66 percent of the cost of the improvement, the local cash contribution now being estimated at \$155,000; provide a suitable public landing for recreational craft; and improve and maintain the shoreline adjacent to the anchorage to make it suitable for recreational use.

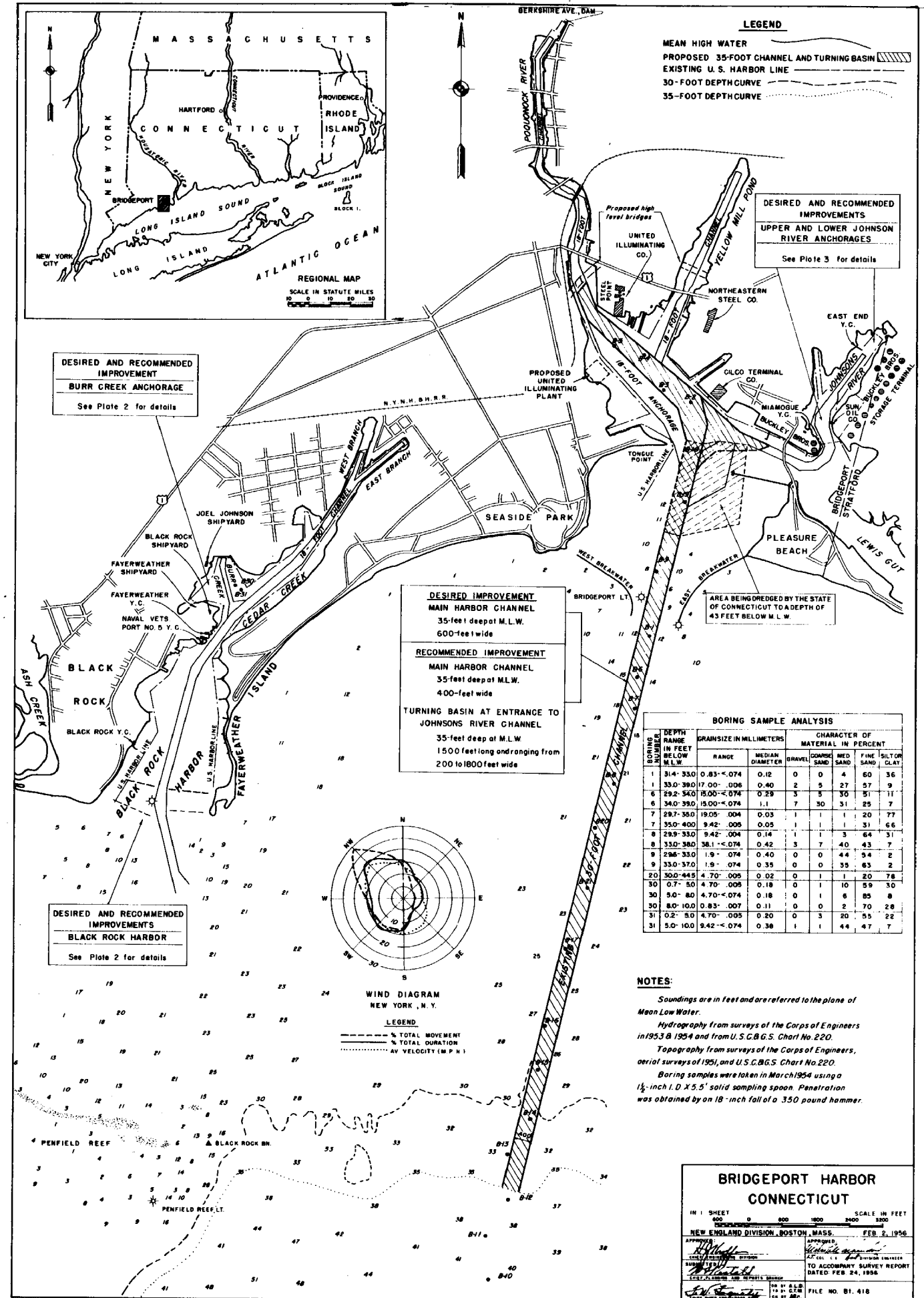
d. Upper Johnsons River Anchorage; That local interests contribute 45 percent of the cost of the improvement, the local cash contribution now being estimated at \$10,000; and provide a suitable public landing for recreational craft.

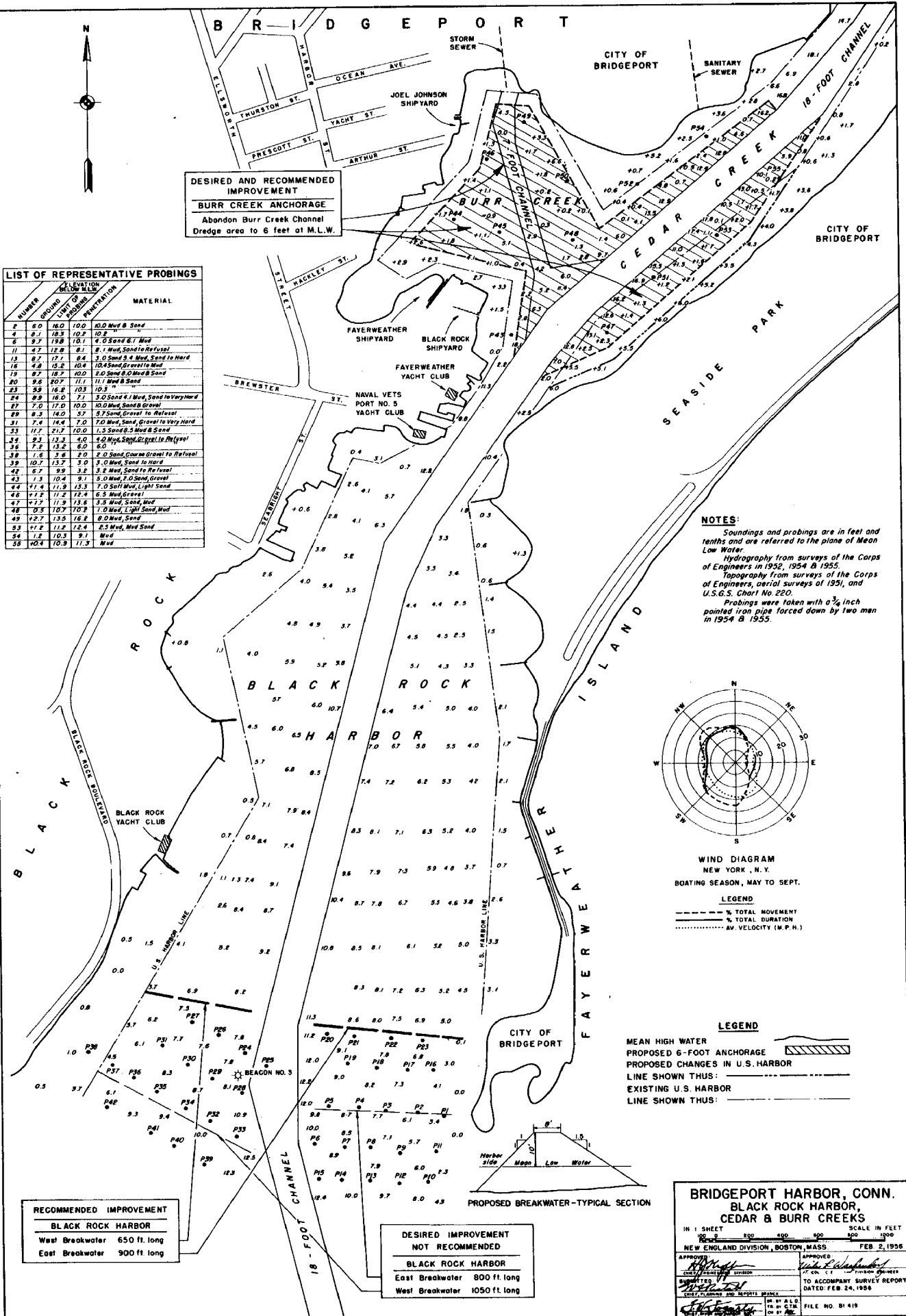
e. Lower Johnsons River Anchorage; That local interests provide a suitable public landing for recreational craft.

234. The above recommended modifications are independently justified and may be constructed either singly or concurrently.

235. Adoption of all the above modifications is recommended subject to the condition that local interests hold and save the United States free from all claims for damages resulting from improvements.

ROBERT J. FLEMING, JR.  
Brigadier General, USA  
Division Engineer

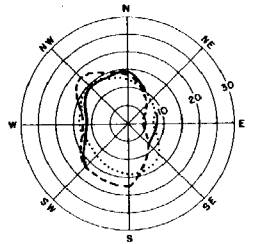




DESIRED AND RECOMMENDED IMPROVEMENT  
BURR CREEK ANCHORAGE  
Abandon Burr Creek Channel  
Dredge area to 6 feet at M.L.W.

LIST OF REPRESENTATIVE PROBINGS			MATERIAL
NUMBER	ELEVATION MEAN M.L.W.	DEPTH IN FEET	
1	6.0	10.0	10.0 Mud & Sand
2	9.1	10.2	10.2 Sand & Mud
3	9.7	10.1	4.0 Sand & Mud
4	12.8	8.1	8.1 Mud, Sand to Refusal
5	8.7	8.4	3.0 Sand & Mud, Sand to Hard
6	15.2	10.4	10.4 Sand Gravel to Mud
7	18.7	10.0	10.0 Sand & Mud & Sand
8	10.7	11.1	11.1 Mud & Sand
9	16.8	10.3	10.3 "
10	16.0	7.1	3.0 Sand & Mud, Sand to Very Hard
11	17.0	10.0	10.0 Mud, Sand & Gravel
12	14.0	5.7	5.7 Sand, Gravel to Refusal
13	14.4	7.0	7.0 Mud, Sand, Gravel to Very Hard
14	21.7	10.0	1.5 Sand & Mud & Sand
15	13.3	4.0	4.0 Muds, Sand, Gravel to Refusal
16	13.2	6.0	6.0 "
17	3.8	2.0	2.0 Sand, Gravel to Refusal
18	13.7	3.0	3.0 Mud, Sand to Hard
19	9.9	3.8	3.8 Mud, Sand to Refusal
20	10.4	9.1	9.1 Mud, 2.0 Sand, Gravel
21	11.9	13.3	7.0 Soft Mud, Light Sand
22	11.2	6.5	6.5 Mud, Gravel
23	11.9	13.6	3.5 Mud, Sand, Mud
24	10.7	10.2	1.0 Mud, Light Sand, Mud
25	13.5	16.8	8.0 Mud, Sand
26	11.2	12.4	2.5 Mud, Mud Sand
27	10.3	9.1	Mud
28	10.4	11.3	Mud

NOTES:  
Soundings and probings are in feet and tenths and are referred to the plane of Mean Low Water.  
Hydrography from surveys of the Corps of Engineers in 1952, 1954 & 1955.  
Topography from surveys of the Corps of Engineers, aerial surveys of 1951, and U.S.G.S. Chart No. 220.  
Probings were taken with a 3/4 inch painted iron pipe forced down by two men in 1954 & 1955.



WIND DIAGRAM  
NEW YORK, N. Y.  
BOATING SEASON, MAY TO SEPT.

LEGEND  
--- % TOTAL MOVEMENT  
- - - % TOTAL DURATION  
..... AV. VELOCITY (M. P. H.)

LEGEND  
MEAN HIGH WATER  
PROPOSED 6-FOOT ANCHORAGE  
PROPOSED CHANGES IN U.S. HARBOR  
LINE SHOWN THUS: ---  
EXISTING U.S. HARBOR  
LINE SHOWN THUS: - - -

RECOMMENDED IMPROVEMENT  
BLACK ROCK HARBOR  
West Breakwater 650 ft. long  
East Breakwater 900 ft. long

DESIRED IMPROVEMENT  
NOT RECOMMENDED  
BLACK ROCK HARBOR  
East Breakwater 800 ft. long  
West Breakwater 1050 ft. long

BRIDGEPORT HARBOR, CONN.  
BLACK ROCK HARBOR,  
CEDAR & BURR CREEKS

IN 1 SHEET SCALE IN FEET  
100 200 400 600 800 1000

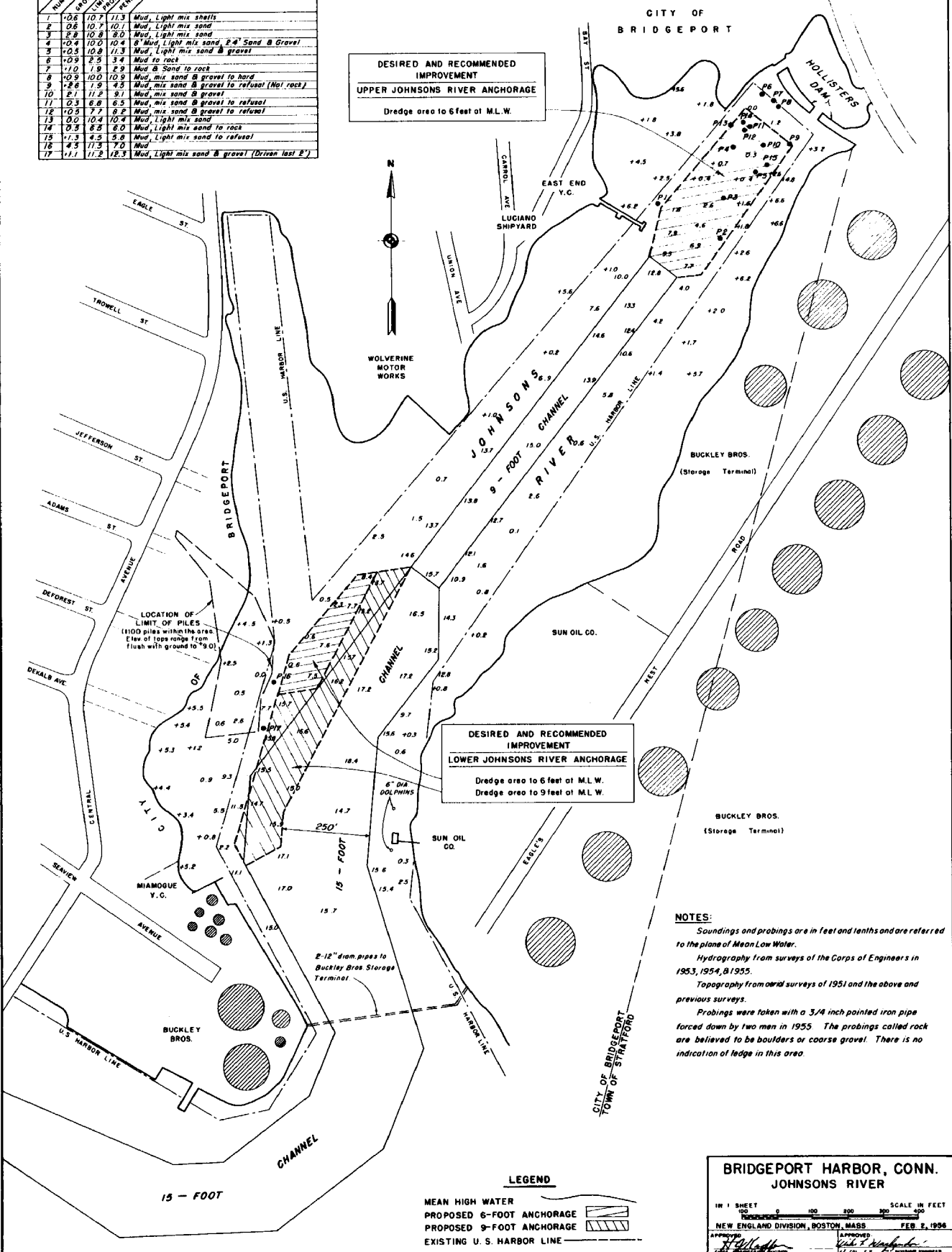
NEW ENGLAND DIVISION, BOSTON, MASS. FEB. 2, 1955

APPROVED: *[Signature]*  
CHIEF OF DIVISION

TO ACCOMPANY SURVEY REPORT  
DATED FEB. 24, 1955

FILE NO. B1419

LIST OF PROBINGS				
NUMBER	GROUND	ELEVATION BELOW M.L.W. IN FEET	DEPTH IN FEET	MATERIAL
1	0.6	10.7	11.3	Mud, Light mix shells
2	0.6	10.7	10.7	Mud, Light mix sand
3	2.8	10.8	8.0	Mud, Light mix sand
4	0.4	10.0	10.4	Mud, Light mix sand, 2' Sand & Gravel
5	0.5	10.8	11.3	Mud, Light mix sand & gravel
6	0.9	2.5	3.4	Mud to rock
7	1.0	1.9	2.9	Mud & Sand to rock
8	0.9	10.0	10.9	Mud, mix sand & gravel to hard
9	2.6	1.9	4.5	Mud, mix sand & gravel to refusal (Not rock)
10	2.1	11.2	9.1	Mud, mix sand & gravel
11	0.3	6.8	6.5	Mud, mix sand & gravel to refusal
12	0.5	7.7	8.2	Mud, mix sand & gravel to refusal
13	0.0	10.4	10.4	Mud, Light mix sand
14	0.5	8.5	8.0	Mud, Light mix sand to rock
15	1.3	4.5	5.8	Mud, Light mix sand to refusal
16	4.5	11.5	7.0	Mud
17	1.1	11.2	12.3	Mud, Light mix sand & gravel (Driven last 2')



**NOTES:**  
 Soundings and probings are in feet and tenths and are referred to the plane of Mean Low Water.  
 Hydrography from surveys of the Corps of Engineers in 1953, 1954, & 1955.  
 Topography from aerial surveys of 1951 and the above and previous surveys.  
 Probings were taken with a 3/4 inch pointed iron pipe forced down by two men in 1955. The probings called rock are believed to be boulders or coarse gravel. There is no indication of ledge in this area.

**BRIDGEPORT HARBOR, CONN.  
JOHNSONS RIVER**

IN 1 SHEET  
 SCALE IN FEET  
 0 100 200 300 400  
 NEW ENGLAND DIVISION, BOSTON, MASS. FEB. 2, 1956

APPROVED: *[Signature]*  
 TO ACCOMPANY SURVEY REPORT  
 DATED: FEB. 24, 1956  
 FILE NO. B1420



## APPENDIX

### DIGEST OF PUBLIC HEARING AND CORRESPONDENCE

1. This appendix presents a digest of the public hearing held by the Division Engineer, New England Division, in Bridgeport, Connecticut on December 15, 1949. The hearing was held to determine the advisability of modifying the existing project at Bridgeport Harbor.
2. There is also included in this appendix a digest of correspondence from local interests since the hearing.

DIGEST OF PUBLIC HEARING - DECEMBER 15, 1949

<u>Speaker</u>	<u>Interest Represented</u>	<u>Improvement Desired</u>	<u>Reasons Advanced and Other Remarks</u>
Mr. Waldo E. Clarke, Engineer and Secretary	Commissioners of Steamship Terminals, State Pier, New London, Conn.	40 foot main channel	There is a general need for deeper harbors because of increased draft of new tankers, the possibility of a steel mill in Connecticut, and industrial development.
Mr. John J. Curry	State Flood Control and Water Policy Committee	-----	No opinion.
20 The Honorable Jasper McLevy, Mayor	City of Bridgeport, Conn.	40 foot main channel, improve- ments in Black Rock Harbor.	The city needs increased depth in Bridgeport Harbor, deepening and widening Cedar Creek and Black Rock Harbor and improvements and exten- sions to the breakwater.
Mr. Bernard Hourihan, Harbor Master	City of Bridgeport, Conn.	600 foot wide main channel	Presented a statement on amount of commerce and water traffic, yacht clubs and pleasure craft. The 600 foot wide channel is needed because of danger of ships being swerved by cross winds and going aground in the present channel.
Colonel James D. Skinner, Chairman	Port Development Committee, Bridgeport Chamber of Commerce	35 or 40 foot main channel 600 feet wide, improvement in Black Rock Harbor	Need improvements because of their value to the city and the hinter- land.

Mr. Harold L. Schine

Cilco Terminal  
Company, Inc.

40 foot by 600  
foot main channel

Needed to reduce delay to lumber  
vessels and make harbor attrac-  
tive to steamship lines that  
now avoid it.

Mr. Martin J. Ryan

Buckley Bros.,  
also member Port  
Development  
Committee, Bridge-  
port Chamber of  
Commerce

40 foot by 600  
foot main channel

Stated scope of business: (1) Firm  
sells at retail and wholesale gasoline,  
kerosene, fuel oil, No. 5, Bunker C  
or No. 6 fuel and (2) Firm operates  
a public petroleum products storage  
terminal with more than 72,000,000  
gallons of storage. Firm delivers  
by barges or trucks to Mass., R.I.,

Conn., Long Island, N.Y., and N.J. Barges operate out of Bridgeport into New Bedford, Pawtucket, New London, Norwich, Hartford, Middletown, New Haven, Devon, Bridgeport, Norwalk, Oyster Bay, Long Island City and Linden, New Jersey. Channel deepening is not a provincial thing since deliveries go into one of the largest segments of industrial New England. Improvement needed because: (1) Schedule contemplates 40 or 50 tankers with 29 to 31 foot draft in 1950. The channel is only 30 feet and an off shore wind can reduce that by 2 or more feet. Ships have to lay at anchor outside the harbor and wait for sufficient water before entering the channel. Idle time can cost from \$35,000 to \$50,000 yearly at U. S. M. C. rates. The channel should be deep enough to permit entry at any-time in any weather. (2) Tankers have and will increase in size tremendously. Transportation cost is a vital element in cost of a commodity delivered to consumer. In the past liberty size tankers of 65,000 bbl. capacity were used. The cost about the same to operate as a T-2 of 125,000 bbl. capacity. That is about 15% more per bbl. than in the T-2. The Liberty tanker is now obsolete. The Super Tanker is now making the T-2 obsolete. A comparison table is enlightening. Percentagewise the

	<u>T-2</u>	<u>Super Tanker</u>
Length	525	625
Beam	68	83
Draft	31	34
Capacity	125,000 bbls.	250,000 bbls.
Officer & Crew	44	52
Payroll/year	\$250,000	\$300,000
Fuel used/day	300 bbl.	400 bbl.
Speed	14½	18
Cost	37¢/bbl.	25¢/bbl.

Super Tanker carries 100% more  
product, 20 to 25% greater speed,  
at a 31-1/2% or about 1/3 less  
cost than a T-2 tanker. Figures  
were taken from actual cost records  
of tankers on runs from the Persian  
Gulf and Venezuela to New York and  
Philadelphia. On the basis of 6 to  
7 million bbls entering Bridgeport  
each year the saving would be  
\$720,000 to \$840,000. If half of  
the product came in super tankers  
the savings would be \$360,000 to

\$420,000 each year, and if only 25% came in these ships the savings would be \$200,000. If the harbor was improved Buckley Bros. would have to spend \$75,000 to tie in with the deeper channel. There are now 50 Super Tankers in operation and on October 31 there were 56 being built.

Mr. Gerald A. Fitzgerald	Veteran & small taxpayer	60 foot by 600 foot main channel	Improvement needed to assure continued industrial development of the city. In favor of any improvement at any time to make the City more beautiful.
Mr. William B. W. Smith	Industrial Real Estate Broker and Management	Harbor improvement and fill of marsh areas in Stratford Meadows.	Improvement needed for future industrial development. Filling would probably increase the value of 800 acres a minimum of \$1000 per acre.
Mr. G. H. Shepard	NYNH & H.R.R.	None	No objection to project as defined, would object if project considered deeping channel above Steel Point where it might undermine railroad bridge.
Mr. Raymond L. French, Executive Secretary	Bridgeport Chamber of Commerce	40 foot by 600 foot main channel, improvements at Black Rock Harbor.	Improvement needed to increase lumber and general cargo shipments. 40 foot channel needed to provide for Super Tankers. Cilco Terminal agrees to treble present receipts, add 30,000 tons of general cargo,

50 employees and spend \$100,000 on their dock. Bridgeporters have already spent over \$3,000,000 on harbor facilities and will spend whatever is necessary to meet conditions imposed by a 40 foot channel. The oyster people are disturbed every time we dredge and would like to see it up to 40 feet now and have it over with. Improvements at Black Rock would reduce shore erosion.

Mr. John Weir, Esq.	H. J. Lewis Oyster Company	None	Opposed to any further dredging in Bridgeport Harbor area. Dredging
---------------------	----------------------------	------	---

damages oyster grounds and the harm done to the oyster industry and the people dependant upon it will far exceed any benefits to other industries. If, however, any further dredging be determined upon, we very strongly urge that notice of the starting date be given to the oyster growers at least a year ahead so that they may remove as many oysters as possible and minimize damages.

Mr. W. Allen Flower

Frank M. Flower  
& Sons. None

Firm has oyster bed in Black Rock Harbor and is apposed to any dredging or breakwaters for the same reason as the Lewis Company.

Mr. Richard G.  
Demarest

Black Rock Harbor Breakwaters and  
Yacht Club, anchorage in Black  
Fayerweather Yacht Rock Harbor  
Club and Sound View  
Yacht Club

There are 3 yacht clubs in Black Rock Harbor. Black Rock Yacht Club has a membership of 175, and owns 475 feet of frontage. Fayerweather Yacht Club has over 450 members and 249 feet of frontage. Sound View Yacht Club has about 50 members and 280 feet of

water front. The combination of these three represents about \$150,000 in property value. These do not include other waterfront organizations such as the Coast Guard Auxiliary, the U. S. Power Squadron and the National Assoc. of Naval Veterans, as well as a large percentage of independent yachtsmen. According to a survey it is estimated that over \$240,000 annually is spent in connection with the activity. It is felt that yachting could be greatly increased by improvement. The harbor has been described as having little protection in southerly winds and hard blows. There is no desireable port of refuge between Duck Island Roads and Stanford Harbor. Most of the harbors between these points are either over-crowded, shallow channels, too commercial, protection not good in a hard blow, or have no facilities for repairs, and the best guide information will not recommend entering a number of harbors after dark. In spite of this discouragement over 500 transient yachts enter Black Rock Harbor annually. Out of the \$240,000 spent by yachtsmen each year about \$20,000 is spent by transient yachtsmen.

Mr. Paul H. Cullinan

Fayerweather  
Shipyard and  
Joel J. Johnson  
Shipyard

Breakwaters and  
anchorage in Black  
Rock Harbor plus  
clearing and  
maintaining Burr  
Creek channel 7  
feet by 100 feet.

The shipyards are in favor of improving Black Rock Harbor as a port of refuge because of the increase in yachting activity that would follow. Such improvement would increase business in the port as well as shipyard business.

Mr. Charles S. Brody

Black Rock Harbor  
Businessmens'  
Association

Breakwaters and  
anchorage

The improvement would produce commercial benefits due to increased harbor traffic and improve the City as a place to live.

Mr. Louis S.  
Jacobson

Berkshire  
Chemical

Breakwaters  
and anchorage

Improvement would make the area more attractive to new industry, which would provide more jobs.

Mr. Charles H.  
Merritt

Boat owner

Breakwaters  
and anchorage

Educational aspect of yachting would be improved. There are 3 to 5 storms a year which bring at least one yacht ashore causing damages.

LETTERS RECEIVED AT THE HEARING

Writer	Interest Represented	Improvement Desired	Reasons Advanced and Other Remarks
Mr. Thomas J. Allen	U. S. Dept. of Interior, National Park Service, Region One	-----	None of the areas administered by the NPS will be affected by the improvements proposed.
Mr. Thomas H. Wigglesworth	U. S. Dept. of Interior Acting Reg. Engr. Div. of Power	-----	We have no interest in this area.
Mr. Raymond W. Knapp, Pres. Catherine M. O'Dwyer, Sec.	Long Beach Improvement Association	Widening and deepening harbor. Fill material placed on Long Beach.	Essential to growth and development of Bridgeport and Stratford to prevent beach erosion and repair damage now evident.
Mr. Joel J. Johnson	His shipyard	Completion of existing project on Burr Creek	Completion would permit full use of waterway increase 200% the number of employed and total business volume. Annual \$32,000 business would increase to nearly \$100,000. Number of employees from 5 to 12. Boat storage could increase from 25 to 50 or 60.
Mr. Issac E. Shine	Cilco Terminal Co., Inc.	40 by 600 feet main channel	Terminal would be more attractive to steamship lines that now avoid it. Lumber handled would increase from 17,000,000 feet to 50,000,000 feet. Improvement would enable terminal to handle 30,000 tons of general cargo. Business would require 50 additional persons and \$100,000 expenditure for additional warehouses.

Mr. H. W. Warley Pres.	Calmar Steamship Corporation	Replace Nun buoy No. 14 with a lighted buoy.	There are no lighted aids to navigation between Cilco Terminal and the break- water light.
Mr. S. D. Locke Pres.	Board of Park Commissioners, Dept. of Public Parks, Bridgeport Conn.	Repair of Fayer- weather Island breakwater and new breakwater at Black Rock Harbor.	To improve existing breakwater as a walk and provide protection for the harbor. Fill could be placed in the low central part of Fayerweather Island without diking and without charge by the City.
Mr. Joseph Savage	Black Rock Ship- yard	None	Dredging the 7 foot by 100 foot chan- nel up Cedar Creek (Burr Creek?) to Yacht Street will further corrode the shore line. If dredging is to be done a bulkhead to protect the shipyard shore line should be in- stalled.
Mr. Arthur Clifford	A. W. Burritt Company	Deepening main harbor.	Lumber from west coast is unloaded at Cilco Terminal. Improvement would enable ships of greater draft to enter port.
Mr. S. P. Senior Pres.	Stratford Improve- ment Company Bridge- port Hydraulic Com- pany	Harbor improve- ments and fill on Stratford Meadows	Own land suitable for industrial de- velopment but needs fill. A railroad siding could be built.
Mr. Charles S. Brady, Esq. Mr. John Doherty, Chairman Civic Com- mittee	Black Rock Business- men's Association	Black Rock Harbor improvements	Association spearheaded movement by which Burr Creek was closed off. The creek is now being filled in and a park and recreation area is planned there. Association is primarily in- terested from the standpoint of

benefits to property and home owners. Improvement would add to the beautification of the area, and improve property values and make the area an even pleasanter place to live.



Letters addressed to Mr. Richard G. Demarest, Jr. endorsing the improvement of Black Rock Harbor as a harbor of refuge were received from:

<u>Name</u>	<u>Association</u>	<u>Address</u>	<u>Interest or Title</u>
Mr. John V. Hayes	Rider, Hayes Co., Inc.	Bridgeport, Conn.	Marine supplies
Mr. Irving D. Jacobson	Jacobson Shipyard, Inc.	Oyster Bay, N. Y.	Boat storage and repair
Mr. Roderick Stephens, Jr.	Cruising Club of America	----	Commodore
Mr. G. H. Richards	Cruising Club of America	New York, N. Y.	Vice Commodore
Mr. Frank S. Connett	Cruising Club of America	New York, N. Y.	Member
Mr. Coert DuBois	Cruising Club of America	Stonington, Conn.	Member
Mr. Francis Goodwin II	Cruising Club of America	Hartford, Conn.	Member
Mr. Charles A. Goodwin	Cruising Club of America	Hartford, Conn.	Member
Mr. James T. Northrop	Cruising Club of America	New York, N. Y.	Member
Mr. John Perrin	Cruising Club of America	Boston, Mass.	Member
Mr. Roger H. Williams	Cruising Club of America	New York, N. Y.	Member
Mr. W. O. Stuart	United States Power Squadrons	Quaker Hill, Conn.	JN, District Secretary, First District
Mr. Arthur B. Willhelm	New London Power Squadron	New London, Conn.	Secretary
Mr. I. R. Peterson	Housatonic River Power Squadron	Bridgeport, Conn.	Commander

Mr. Albert Christensen	U. S. Coast Guard Auxiliary	-----	Capt. West. Conn. Division
Mr. Joseph E. Hurlburt	U. S. Coast Guard Auxiliary	Bridgeport, Conn.	Commander, Flotilla 711
Mr. Norman Wenz	National Association of Naval Veterans	Bridgeport, Conn.	Commander
Mr. Frederick Cockerill	National Association of Naval Veterans	Bridgeport, Conn.	Chief Yeoman
Mr. Richard V. Wakeman	Beverly Yacht Club	Marion, Mass.	Commodore
Mr. Karl G. Knabenschuh	Branford Yacht Club	Branford, Conn.	Commodore
Mr. Maclear Jacoby	Cedar Point Yacht Club	Westport, Conn.	Secretary
Mr. F. A. Murray	Englewood Basin Yacht Club	Englewood, N. J.	Commodore
Mr. I. R. Peterson	Housatonic Boat Club	Stratford, Conn.	Commodore
Mr. R. Carlton Fontaine	Huguenot Yacht Club	New Rochelle, N. Y.	Commodore
Mr. Frederick W. Bick- mann	Huntington Yacht Club	Huntington, N. Y.	Commodore
Mr. Henry H. Jessup, Jr.	Indian Harbor Yacht Club	Greenwich, Conn.	Secretary
Mr. H. H. Rennell	Pequot Yacht Club	Southport, Conn.	Commodore
-----	Riverside Yacht Club	Riverside, Conn.	Fleet Captain
Mr. William Boyd, Jr.		Pittsburgh, Penna.	
Mr. Thomas H. Closs		Port Washington, N. Y.	

Mr. W. H. DeFontaine

New York, N. Y.

Mr. Edgard DuPrey

Old Westbury, L.I., N.Y.

Mr. Ridsdale Ellis

New York, N. Y.

Mr. Durbin Hunter

Great Neck, N. Y.

Mr. Maclear Jacoby

Saugatuck, Conn.

Mr. William E. Lundgren

New York, N. Y.

Mr. A. M. Morse

Larchmont, N. Y.

Dr. Paul B. Sheldon

New York, N. Y.

☐ Mr. Duncan Sterling

New York, N. Y.

Mr. E. D. Walen

Andover, Mass.

Mr. W. B. Watkins

Berryville, Vir.

Mr. Charles P. Rainey

Fairfield, Conn.

also signed by:

Mr. Anthony E. -----, C. H. DeRamates, F. Koterba, R. M. Patterson, Ralph McCarty, John Blatchley, Geo. G. Symes, Jr., Lloyd W. Cutting, Arthur S. Havuson, Donald B. Perley, Anthony Drew, James Pezzulle, W. A. Dunham, R. H. Elston, H. H. Perkins, L. S. Ferris.

CORRESPONDENCE SINCE THE HEARING DECEMBER 15, 1949

<u>Signed by</u>	<u>Interest</u>	<u>Date and Remarks</u>
Mr. Richard G. Demarest, Commodore	Black Rock Yacht Club	Feb. 15, 1950. Inclosed letters to him endorsing improvement of Black Rock Harbor as a harbor of refuge from: Mr. Randolph E. Tyrrel, New York, N.Y.; Henry T. Meneely, Essex, Conn.; R. L. Ireland, Cleveland, Ohio; Alonzo Dejessop, San Diego, Calif.; Gay Chadwick, Capt. USN., Cambridge, Mass.; F. W. Murry, Jr., Goshen, N.Y.; Henry M. Devereux, City Island Yacht Club, New York, N.Y.; Alfred Stanford, New York, N.Y.; H. Hudgins, New York N.Y.; W. Roy Manny, Brooklyn, N.Y.; Dale E. Cooper, AP, Secretary Mid-Hudson Power Squadron, Beacon, N.Y.; Harvey Conover, New York, N.Y.
Mr. J. H. Dockendorff	Stratford Improvement Co.	May 22, 1950. We are making a study of a pipe line to transport oil from Bridgeport to Hartford and Springfield. This would mean an additional T-2 per week or 800,000 to 1,000,000 additional tons per year into the harbor.
Mr. D. W. Lovejoy	Tidewater Associated Oil Co.	May 24, 1950. Information on Oil deliveries.
Mr. C. B. Goodman	Shell Oil Co.	May 25, 1950. Information on oil deliveries.
Mr. W. F. Richart	Socony-Vacuum Oil Co.	May 26, 1950. Information on oil deliveries.
Mr. E. G. Maddock	Cities Service Oil Co.	June 1, 1950. Information on tidal delays. Suggest 12 hours per voyage, 13 trips in 1949. Not safe to dock at Buckley Terminal except in daylight.
Mr. M. J. Hannon	Shell Oil Co.	June 2, 1950. Information on oil deliveries.
Mr. M. J. Harmon	Shell Oil Co.	June 13, 1950. Information on oil deliveries.

Mr. W. W. Payne	The Texas Company	June 16, 1950. Information on oil deliveries.
Mr. W. L. Naylor	Gulf Oil Corp.	June 19, 1950. Information on oil deliveries.
The Honorable William Benton	U. S. Senate	July 19, 1950. Request for information on results of 1948 improvements to Bridgeport Harbor.
Mr. Isaac E. Shine	City Lumber Co.	August 17, 1950. Data on vessel grounding inclosing letter from Calmar Steamship Corp. with data. Dates of groundings June 10, 1947, December 14, 1947, May 2, 1949, February 5, 1950.
Mr. Raymond L. French Executive Secretary	Bridgeport Chamber of Commerce	Sept. 6, 1950. Request for copy of analysis of results of improvements of harbor to 30 feet.
Mr. Raymond L. French Executive Secretary	Bridgeport Chamber of Commerce	Sept. 28, 1950. Drop in tonnage in 1950 explained. All business of city fell off in 1950 as it did for the entire country.
Mr. J. R. Simpson	Cities Service Oil Co.	October 2, 1950. Data on tow boat fees and inclosing a letter from their Bridgeport docking pilot suggesting changes in aids to navigation that would permit ships to dock at night.
Mr. Raymond L. French Executive Secretary	Bridgeport Chamber of Commerce	November 30, 1950. Request that harbor improvements be expedited.
Mr. Raymond L. French Executive Secretary	Bridgeport Chamber of Commerce	June 13, 1951. Long statement restating need and arguments for improvement of harbor.

Mr. Raymond L. French  
Executive Secretary

Bridgeport Chamber  
of Commerce

August 14, 1951. Request for information  
on status of report.

The Honorable  
Albert P. Morano

United States House  
of Representatives

November 28, 1951. Request for information  
on what has held up report.

The Honorable  
Jasper McLevy, Mayor

City of Bridgeport

May 20, 1952. Request information on date  
Burr Creek was closed to navigation.

Mr. Raymond L. French  
Executive Secretary

Bridgeport Chamber  
of Commerce

July 9, 1952. Request information on  
status of report.

The Honorable  
Albert P. Morano

United States House  
of Representatives

August 12, 1952. Request information on  
report.

The Honorable  
Prescott Bush

United States Senate

February 2, 1953. Request information on  
report.

Mr. Albert Steade,  
Commodore

Miamogue Yacht Club.

May 15, 1953. The recent relocation of  
channel buoys in Johnsons River has re-  
duced anchorage. If pilings of former  
Lake Torpedo Boat Co. ways were removed  
and shallow east side of river dredged  
there would be ample mooring space.

Mr. Joel J. Johnson

Joel J. Johnson's  
Shipyard

August 10, 1953. Burr Creek channel has  
filled in and I have been forced to refuse  
orders for boats because the channel is too  
shallow to permit launching them.

Mr. Allen B. Vermilya  
Acting Town Manager

Town of Stratford, Conn.

September 22, 1953. If Bridgeport Harbor  
is dredged the Town would be helped if  
material could be used to improve or  
strengthen Long Beach in Stratford.

The Honorable  
Albert P. Morano

United States House  
of Representatives

August 17, 1953. Letter urging immediate steps to complete resurvey report.

The Honorable  
Prescott Bush

United States Senate

August 11, 1953. What will the Corps be able to do toward completion of this project?

Mr. Raymond L. French  
Executive Secretary

Bridgeport Chamber  
of Commerce

September 3, 1953. Request information if work be completed or stopped on report.

Mr. James D. Moore

Summer resident at  
Fairfield Beach, Conn.

September 25, 1953. Your department is dredging part of Burr Creek. It would be a convenience to the residents of the area if the channel could be completed 7 feet by 100 feet. (Note: Dredging by Johnson's Shipyard)

The Honorable  
Prescott Bush

United States Senate

October 19, 1953. Request information on progress of report.

Mr. Sidney A. Edwards  
Managing Director

State of Conn.  
Development Commission

October 19, 1953. Request information on progress of report on Bridgeport Harbor.

The Honorable  
Albert P. Morano

United States House  
of Representatives

April 19, 1954. Request action on letter from East End Yacht Club stating that the channel at the head of Johnson's River is being silted up because a company upstream is dumping silt into the river.

Mr. John J. Curry  
Chief Engineer

Flood Control and Water  
Policy Commission, Conn.

June 14, 1954. Information on Miamoge Yacht Club anchorage problem.

The Honorable  
Albert P. Morano

United States House  
of Representatives

June 17, 1954. Request for action on letters from Miamoge Yacht Club June 11, 1954 desiring anchorage in Johnson's River.

The Honorable  
Edward Martin, Chairman

Committee on Public  
Works United States  
Senate

July 20, 1954. Letter inclosing resolution requesting the Board of Engineers for Rivers and Harbors to review the Bridgeport Report with particular reference to Johnson's River below Hollisters Dam.

The Honorable  
Albert P. Morano

United States House  
of Representatives

July 26, 1954. Request comment on possibility of modifying the existing Federal Project to restore it to the 1899 project providing a 9 foot by 100 foot channel to about 100 feet below Hollisters Dam.

The Honorable  
Prescott Bush

United States Senate

November 5, 1954. Request information on survey with reference to proposed harbor deepening by Conn. Highway Department to obtain fill for highways.

The Honorable  
Antoni N. Sadlak

United States House  
of Representatives

November 17, 1954. Request information on survey.

Mr. Richard E. Blake  
Director of Public Works

Town of Stratford, Conn.

December 20, 1954. Understand a study of recreational small boat facilities in Bridgeport area is underway. Request that Salt Meadows area near Johnson's River be considered for a marine basin.

Mr. Sidney A. Edwards  
Managing Director

State of Conn.,  
Development Commission

March 28, 1955. Request information on progress.

Mr. Albert Steade  
Commodore

Miamogue Yacht Club

May 3, 1955. Acknowledgment of April 26 letter requesting data on small craft.

Mr. John S. Barton  
Commodore

Black Rock Yacht Club

May 6, 1955. Acknowledgment of April 26 letter. Question on how to answer questionnaire.



Mr. Bruno Rubinsky, Chairman, Harbor Improvement Committee	East End Yacht Club	May 7, 1955. Reply to April 26 letter and questionnaire.
Mr. R. A. Bailly General Superintendent	Cities Service Oil Company	May 18, 1955. Our new supertankers will be used solely in coastwise trade from U. S. Gulf ports to any East Coast ports which they can enter.
Mr. Howard F. Burbank Chief Engineer	Wolverine Motor Works, Inc.	June 14, 1955. Request information on proposed improvements in Johnson's River.
Mr. Floyd W. Buck Superintendent of Engineering	United Illuminating Company	June 21, 1955. Data on proposed expansion inclosing curve of predicted fuel use to 1975.
Mr. Floyd W. Buck Superintendent of Engineering	United Illuminating Company	June 22, 1955. Additional information.
Mr. A. F. Hannon Commodore	Fayerweather Yacht Club	June 21, 1955. Reply to questionnaire and April 26 letter.
Mr. J. F. Jacot, Chief, Operations Division	Third Coast Guard District	June 21, 1955. Information on navigational aids required for proposed plans of improvement.
Mr. M. Forte, Commander	U. S. Coast Guard Auxiliary Flotilla 711	June 23, 1955. Reply to questionnaire on small boats.
Mr. Bruno Rubinsky Harbor Improvement Committee	East End Yacht Club	June 27, 1955. Inclosed approval of Buckley Brothers of Upper Johnson's River anchorage.
Honorable Jasper McLevy, Mayor	City of Bridgeport	June 27, 1955. Inclosed desired plans of improvement for anchorage areas in Johnson's River and Burr Creek.

Mr. Albert Steade  
Commodore

Miamogue Yacht Club

June 28, 1955. Inclosed approval of Wolverine Motor Works and Buckley Brothers of Lower Johnson's River Anchorage and data requested on April 26 questionnaire.

Mr. John S. Barton  
Commodore

Black Rock Yacht Club

June 30, 1955. Detailed reply to questionnaire. Request that location of proposed breakwaters be slightly changed to provide more protection. If two breakwaters are too expensive, suggest only one. Dredging for anchorage should be kept to minimum. Depth needed is 4 or 6 feet for small boats.

Mr. Joseph T. Wilson, Jr.  
Manager, General Accounting  
Dept.

Sun Oil Co.

July 1, 1955. Data on bulk plant and dock on Johnson's River.

17 Mr. Charles E. Smith  
City Engineer

City of Bridgeport

August 3, 1955. Request for further information on Burr Creek Anchorage.

Mr. Albert Steade  
Commodore

Miamogue Yacht Club

August 19, 1955. Forwarded without comment letters from Sun Oil Co. requesting slight change in

proposed lower Johnson's River Anchorage so that it would not interfere with operation of boats at their dock.

Honorable  
Jasper McLevy, Mayor

City of Bridgeport

October 17, 1955. Approved deepening main harbor channel but felt 35' would be better than 33'. Approved both

Johnson's River Anchorages and indicated that city would meet requirements of local cooperation for them. Indicated that Black Rock Harbor breakwaters and Burr Creek anchorage were desirable but involved such large expenditures by the city that they should be considered by the Common Council.

Mr. W. Dudley Jewell  
Exec. Vice President

Bridgeport Chamber of  
Commerce

October 18, 1955. Strong objection to 33' main channel. Request report be delayed until after conference can be held in November.

Honorable  
Jasper McLevy, Mayor

City of Bridgeport

February 15, 1956. Although unable to  
commit the city to the expenditure, of  
sums involved in Black Rock Breakwaters

and the anchorage the Mayor feels that as soon as the Government share of the program is authorized, the City of Bridgeport will take the necessary steps to meet its share in matching the Federal funds. He is sure that the city will cooperate as soon as Federal allocation of funds becomes available. He does not believe these programs should be tied up in one package that might mean the failure of the more pressing need for the 35 foot main channel and the Johnson's Creek Anchorages.